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. 137 NO. 2 AUGUST 22 1959 Price 1s. Weekly

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IN ITS 76th YEAR

August 22 1959

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NOTES of the WEEK

Factory Accidents

ROYAL assent was given on July 29 to the Factories Bill, which was introduced into the House of Commons in November 1958 and recently completed its passage through Parliament. The new act amends the Factories Acts, 1937 and 1948, and makes further provisions as to the health, safety and welfare of workers in factories and other places subject to the Factories Acts. The three main objects of the act are: to improve the existing provisions with regard to fire precautions in factories; to place upon the Minister of Labour and National Service the duty of promoting health, safety and welfare in places under the Factories Acts; and to revoke Defence Regulation 59 and replace it with a permanent, but more limited, power to grant exemptions from the law regulating the hours of employment of women and young persons. In addition the act increases the maximum fines which can be imposed for contraventions of factory law, and strengthens certain existing safety provisions of the Factories Act, 1957, including those relating to dangerous substances and fumes, lifts and cranes, and the maintenance of floors, passages and stairs.

The introduction of this new act is not untimely, as, despite the fact that factory accidents reported in 1958 fell by 4% over the previous year to their lowest level for 23 years, the figures are still very disturbing. In his annual report (published recently as a White Paper) the Chief Inspector of Factories states that the number of accidents reported last year was 167,697 (174,713), but fatal accidents rose to 665 (651).

First-aid Facilities

FOR some time, concern has been felt over first-aid facilities particularly in smaller factories where the person in charge of the first-aid boxes is frequently found to be inadequately trained. One clause of the new Bill requires the person concerned to satisfy the standards of training which will be prescribed in a Statutory Order. In this connexion, the Chief Inspector's report refers to special efforts which have been made, in co-operation with the voluntary training organizations, to stimulate the recruitment and training of persons for first-aid in factories. In 1958, as an experiment, local drives were launched in 42 selected areas. Although it is not possible to assess just what proportion of factory workers coming forward for training by the voluntary organizations represents normal recruitment and what proportion was directly attributable to the special drives, preliminary reports at the end of the year indicated that training arrangements had been made by nearly 1,000 employers. Nearly 400 recruits had already started training, and over 900 applications were being dealt with.

In making recommendations for measures to reduce accidents in industry, the Chief Inspector makes particular reference to the developments in the training of young persons in accident prevention as part of their technical education, and expresses the hope that these developments will continue. 'I am firmly convinced,' he states, 'that a young person armed with such basic knowledge on entering industry will in due course make a valuable contribution not only to his own safety, but also to the safety of others with whom he comes into contact.' It is human to err and industry will never be free of accidents, but the realistic approach to the problem by the new act should stimulate some serious thought and action where it is most needed.

Industry and Education

A CLOSER and more efficient tie-up between industry and commerce and Further Education establishments will result, it is hoped, from a circular which has been issued to local education authorities by Mr Geoffrey Lloyd, Minister of Education. This circular gives guidance on the make-up and functions of governing bodies of all these establishments. A regulation made last March provided that all major establishments should have governing bodies which included substantial representation of industrial, commercial and other appropriate interests. In the case of establishments providing a considerable number of advanced courses, representatives of universities and professional bodies should also be included.

It is the Minister's view, and one which is shared by many, that the governing body of a technical or commercial college should consist largely of people—whether members of the authority or not—who have current experience of problems of industry and commerce relevant to the work of the establishment. It is obvious that the vigorous participation of the representatives of industry and commerce in the life of these establishments is a matter of the utmost importance. If it is to be fruitful, governing bodies must be given an active and responsible part to play.

The circular recommends the extent to which the governing bodies should be given financial power, and be allowed to participate in the appointment of staff and the organization and curriculum of an establishment.

NEWS *Briefs*

GRENOBLE CHEMICAL PLANT — MONTECATINI PROJECT — TYRE RETREADING — DOMINICAN PILOT SCHEME — RUBBER NATIONALIZATION

●**United States** — Ground-breaking ceremonies have been staged marking the beginning of construction of the new 9,500,000 dollar tyre manufacturing plant of the General Tyre and Rubber Company.

●**Malaya**—Mr Heah Jo Seang, president of the Penang Rubber Trade Association, has urged Malaya to make representations to the US concerning disposals from the American rubber stockpile. America, he said, should be reminded of the conditions under which the stockpile was set up. Mr Heah told reporters that the US had promised to release no rubber from the stockpile without first going through the necessary administrative processes. This meant they could not release rubber from the stockpile without at least six months' prior notice and then only with the sanction of Congress.

●**United States** — Montecatini has announced its intention of commencing construction almost at once of a $10m. chemical plant for the production of isotactic polypropylene and other polyolefins. According to Lucio Lucini, president of Novamont Corporation, the wholly-owned American subsidiary of Montecatini which will operate the plant, the company intends to utilize a 200-acre tract it has acquired on the Big Sandy River at Neal, W. Virginia.

●**France**—Two leading French chemical companies — Ugine and Progil — have signed an agreement with the German chemical firm Farbenwerk Bayer to build jointly a plant near Grenoble to produce isocyanates, polyesters, and polyethers.

●**United States**—The tyre retreading industry, a minor factor in the overall replacement sector prior to World War II, has grown immensely in the past few years and reliable trade sources have predicted that the retreading tyre volume soon will reach 1,000 million dollars. The giant rubber companies are vying with the smaller independents for leadership in this field, according to these sources. Industry spokesmen said that tread rubber production climbed to about 465 million lb. in 1958 from the 1949 output of 39.5 million lb. Estimates for 1960 range to over 500 million lb. Trade sources said that one retread is sold for every two units of new passenger car replacement tyres. At the present rate of growth, these trade sources estimated that within five years there will be as many retreads as new tyres sold for replacements.

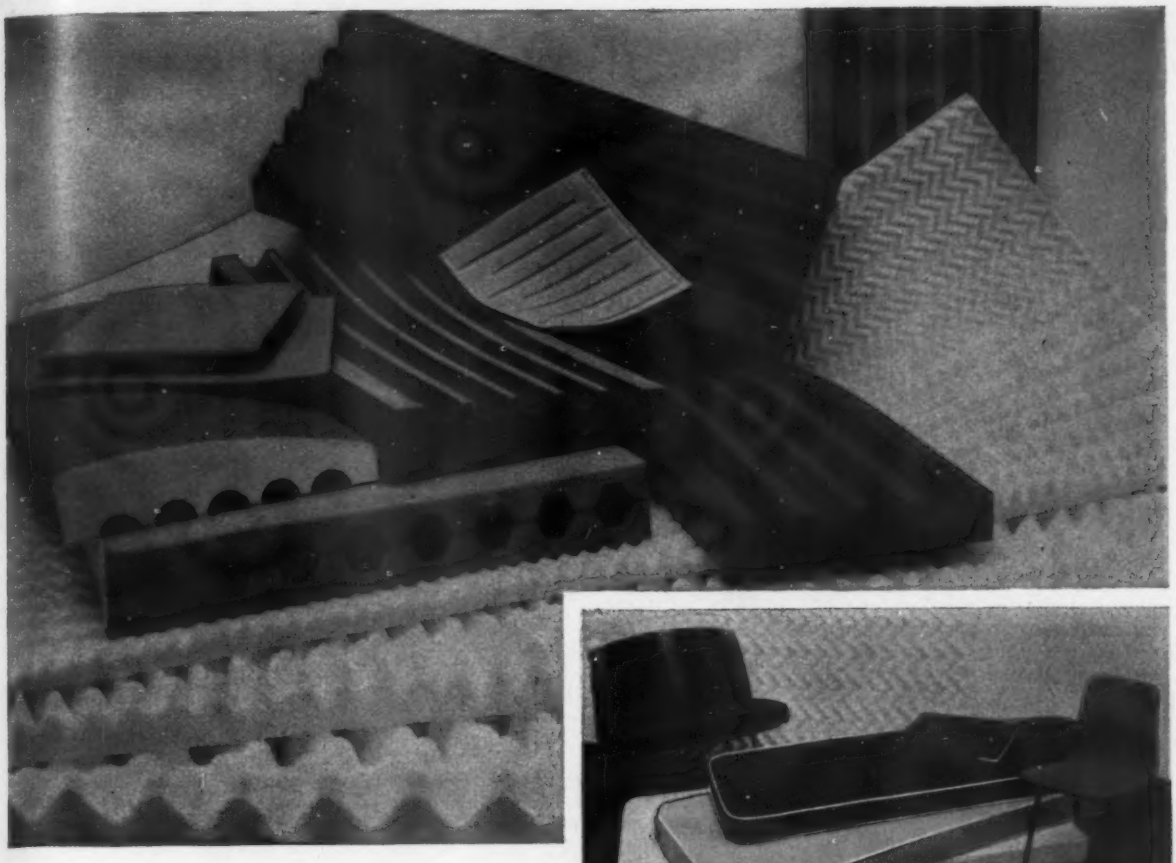
●**Japan** — Consumption of crude rubber in Japan during June totalled 12,800 tons, the Japanese Rubber Importers Association estimates. Consumption also totalled 12,800 tons in May. The Association put stocks of crude at the end of May at 12,830 tons against 13,830 at the end of April. It said the decline in stocks continued in June, but gave no details.

●**Dominican Republic**—After a very successful pilot rubber plantation scheme conducted by the Dominican Republic Department of Agriculture since 1952 in the Samana province, a full-scale effort to launch a rubber industry has been announced. An initial 67,000 trees are planned for some of the areas of heaviest rainfall in the Republic. It is intended that the most modern methods are to be used with a double crop system in operation. The latest figure for production of the pilot scheme is six tons of latex from 1,200 trees. Labour problems will be solved by part-time workers who will also be employed in local agriculture.

Don't mind me — you do your job and I'll do mine! — 446

●**United States** — The House Appropriations Committee, considering an appropriations bill to provide for miscellaneous agencies, deleted the sum of $49 million required to replace stockpile materials (mainly rubber) which are rotated.

●**Malaya** — Any attempt to nationalize Malayan rubber estates would be doomed, Mr Heah Jo Seang, president of the Penang Straits Chinese-British Association, has predicted. Mr Heah said some political parties had threatened to nationalize rubber estates if they came into power after the general elections on August 19. But past experience had shown that a Government could not run enterprises as efficiently as private interests and such action was bound to fail, he added.



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Synthetic Rubbers in Cables—I

STATISTICS, SPECIFICATIONS AND TESTING

By W. S. PENN, B.Sc.

TWENTY years ago natural rubber compounds were the only type of rubber-like insulants used on cables. Since 1939 the position has changed rapidly, the war giving added impetus to the change, and such materials as Neoprene, butyl rubber, silicone rubber and SBR are now well-established products. The rubber cable technologist is in a fortunate position because new materials are continually being produced by suppliers (at least on a development basis). The cable technologist has to examine them all, because anything might fit a gap in the list of desirable characteristics of materials. The tyre technologist has to be far more practical and his scope is clearly limited.

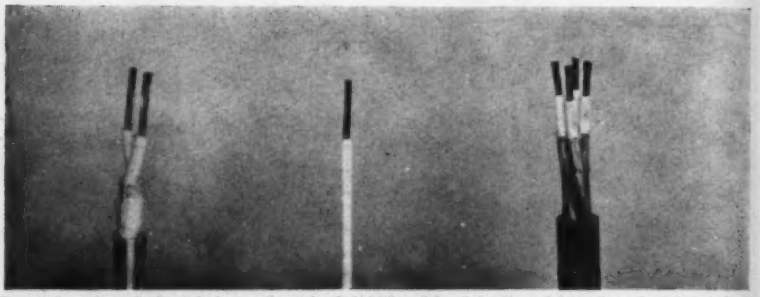
As a result of intense activity over the past few years quite a number of materials have been used, at least on a pilot plant scale. For specific purposes high styrene resins, acrylonitrile rubbers (and their admixtures with PVC), Hypalon, Viton, chlorinated butyl and even Thiokol have found their way into cables. Materials are still being examined and will gradually be introduced during the years to come.

The present series of articles is to discuss various aspects of synthetic rubbers. These will include techniques of compounding and processing; reasons for the use of the materials; results achieved with different compounds and to different specifications will be considered, and economic factors will be mentioned where appropriate.

Statistics

It is not proposed to give any detailed statistics since these are not available for most of the materials, but it is possible to give some idea of the extent to which the synthetic rubbers are being used in the UK. The consumption of natural rubber in cables in 1958 was approximately 8,500 tons. This is not the highest figure which has been recorded (11,390 tons for example in 1952) and there is no doubt that natural rubber is feeling the competition of synthetic rubbers and plastics. The most important synthetic rubber to the cable industry is neoprene. Consumption in 1953 was 827 tons and it has steadily increased since that time. In 1956 it was 1,470 tons and the 2,000 tons mark is in sight. This is quite a substantial proportion of polymer consumption in cables.

The other synthetic rubbers are of comparitively little account compared with neoprene. No actual figures are available, but for 1958 a personal estimate would put SBR at 300 tons, and butyl rubber and silicone rubber at 150 tons each. The butyl rubber does not include the quantities used in polythene as a plasticizer. The quantities of the minor synthetic rubbers consumed are very small and do not amount to more than a few tons each.



Butyl insulated aluminium sheathed 11kV cable, *left*. Butyl insulated shipwiring cable, *centre*. Silicone insulated, butyl filled, armoured, and butyl sheathed cable, *right*. Johnson and Phillips Ltd.

The Future

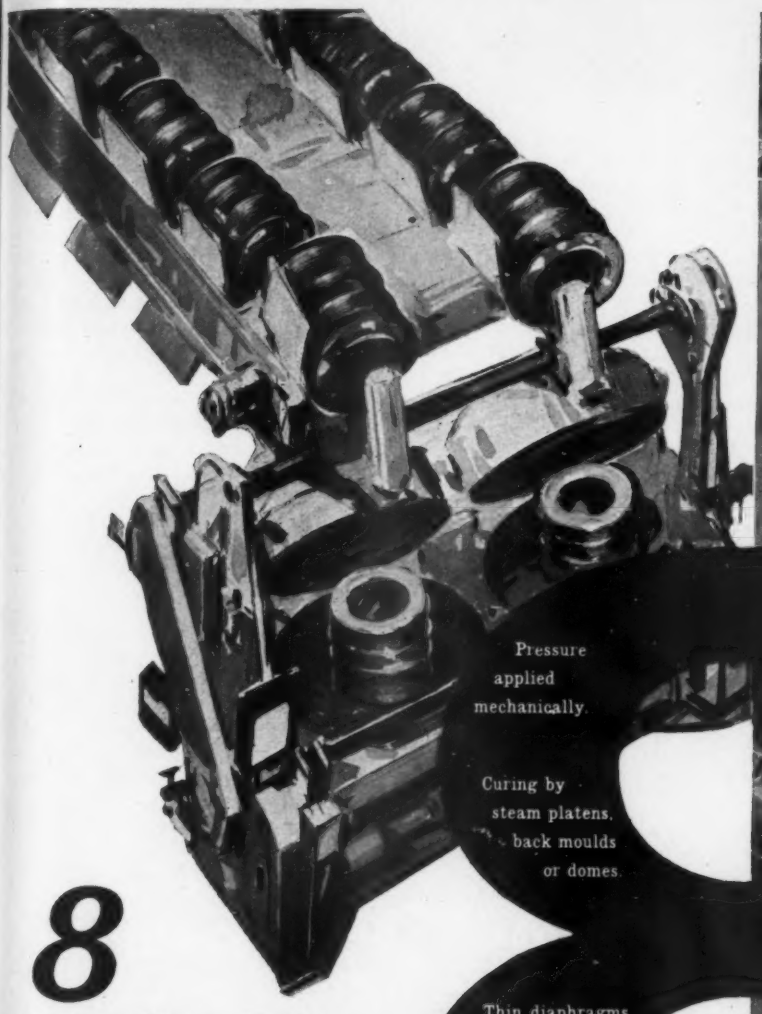
The obvious question is, what are the futures of natural rubber and the synthetics in the cable industry? It appears that the consumption of natural rubber is gradually being reduced, but very slowly indeed. Perhaps it is being held artificially high due to an overall increase in cable production, although the competition from PVC is severe. There seems no reason to doubt that the consumption of neoprene will increase slowly but steadily. The decision of Du Pont to produce neoprene in Northern Ireland will certainly be an effective stimulus, particularly if there is a substantial price reduction. The further decision to produce G and W types instead of the original intention to produce only W types will undoubtedly be applauded.

Cable companies on both sides of the Atlantic have been saying that one day butyl rubber will become the general purpose polymer for cables. Although in the US consumption is measured in thousands rather than hundreds of tons, the changeover to butyl is slow. The material has undoubted merits, but there are processing snags which must be overcome. It will probably be several years before butyl makes any real headway.

The extent of the use of silicone rubbers is limited only by their price. They are excellent materials to work with and have a number of desirable properties. In spite of their price, their use continues to increase and the trend will no doubt go on.

In the field of butadiene-styrene copolymers the future is difficult to predict. At the moment BS 2899 only permits 33⅓% of the polymer to be SBR in sheathing materials and nothing in insulation. This has undoubtedly retarded progress to a certain extent, but the situation may change when the specification allows more synthetics to be used. This will probably be in the not too distant future. SBR has one or two desirable characteristics in cable compounds, but its chief interest is price reduction. There has not been much incentive from this point of view lately, except quite recently, so that the changeover, when and if it comes, may be slow.

The other materials are only used in small quantities. Hypalon is of interest but progress is very slow. Chlorinated butyl looks quite interesting and will undoubtedly become established in the industry. Viton A is also of interest, in spite of its price, and will have a few applications.



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P.2869

British Specifications

The cable industry is characterized by specifications, and many of them. Those in the tyre industry may consider themselves fortunate in that they can put virtually anything into tyres provided that running characteristics are not materially affected. In the cable industry it is quite different. So many types of cables with their dimensions and compounds are specified in detail, which means that changes tend to be slow.

For many years BS 7 has been the general cable specification for rubber cables and their compounds. In the case of rubber compounds there were compositional and physical requirements, but only physical requirements for neoprene. No other synthetics were included except the mention of 33⅓% SBR in the natural rubber sheathing mixes.

Other cable specifications frequently refer back to BS 7. This sometimes creates difficulties as BS 7 contains details of cable construction as well as materials. BS 2899 has now been issued and deals with materials only, the same as those in BS 7.

There are no material specifications for any other synthetics. Butyl rubber and silicone rubber will be mentioned in BS 1327 for various heat resistant types of cables. Some synthetics are mentioned in various Government department specifications. Silicone rubber in DEF12A for example. So that cable specifications will be able to refer to material specifications, there will be British Standard Specifications for butyl and silicone rubbers in due course.

The materials such at Viton, chlorinated butyl and Hypalon, will not find their way into specifications for some considerable time. This, of course, does not preclude their use.

US Specifications

The use of synthetic rubbers in cables in the US is rather in advance of the practice in this country. The reasons are, of course, obvious, in that large quantities of various synthetic rubbers have been available for some years. In some cases there were technical reasons for using synthetics, but in others strategic.

The thought some years ago in the US appeared to be that butyl would rapidly replace natural rubber. That situation has certainly not come about and the original enthusiasm, due to processing snags, has not been maintained. Nevertheless, the material makes headway.

There are already various US Specifications for synthetic rubbers in cables. Their equivalent to BS 7 is ASTM D1350. There are a number of material specifications for various grades of natural rubber compounds and also for neoprene as in the UK. In addition, ASTM D1352 is a specification for ozone-resisting butyl rubber insulation; ASTM D866 is a GR-S (now SBR) sheath and ASTM D754 and 755 are two types of 'synthetic rubber' insulations. The normal type of insulation used for these last two is SBR.

As far as SBR is concerned the US has tackled the matter in rather a different way to the UK. In BS 2899 although a proportion of SBR is allowed in the general purpose sheath no concession is made for this in the tensile strength value. In the US the specifications are for the use of synthetic rubber only and allowance is made for the difference between natural rubber and SBR compounds. For example, the tensile strength of a heavy duty natural rubber sheath (ASTM D532) is 3,500 psi, whereas that for SBR (ASTM D866) is only 1,800 psi.

We will probably be adopting the US method for butyl and silicone rubbers, but not necessarily for SBR. The difficulty lies in the fact that psychologically, if the customer has to choose between two products of different tensile strengths, he will presumably choose the one with the higher tensile strength. This will not necessarily give the best product. The problem of a separate specification for SBR compounds or one where the polymer is used as an alternative to natural rubber in the same specification has yet to be resolved.

Testing

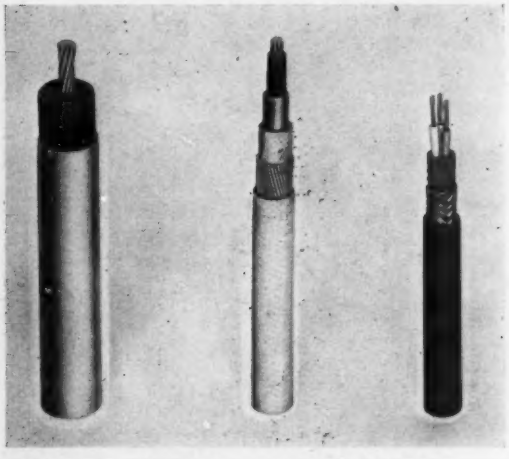
The tests required and the methods of test are laid down for cables in BS 2899 although this refers back to BS 903. Many other cable specifications refer to this. Except where otherwise stated any test results given in future articles will be in accordance with these specifications.

Compared with tyres there are various test differences. Some are obvious; for example insulation resistance, ozone resistance and fire or flame resistance are not generally required in tyres and most of the dynamic tests for tyres are not required for cables. There are also some differences in testing techniques which arise out of the available test pieces. As far as possible, the whole insulation is used as the test piece, and only in the case of larger cables are dumb-bells cut. There are wide differences in tear test methods and, in comparing results from different industries, great care must be exercised.

Two more important differences are in the type of result used. It is more normal in the tyre industry to speak in terms of the modulus at 300% elongation, whereas in the cable industry it is usually 200%. Again in ageing tests the tyre industry uses 70°C. as the ageing temperature, whereas the cable industry still uses the awkward 82.2°C. (180°F.).

If the cable industry is characterized by specifications, these specifications are characterized by ageing tests. The cable industry places far more reliance on the value of accelerated ageing tests as a guide to service than the tyre industry. Any rubber cable laboratory will, therefore, be found to contain many ageing ovens. It is certainly true that one of the major interests in many raw materials is the temperature at which they will operate. With materials ranging from natural rubber to Viton, this means that a series of ageing ovens is required with temperatures from 70°C. ranging up to 300°C.

The object is to age any new



Typical silicone cables. Silicone insulated, aluminium sheathed, *left.* **Silicone core,** *centre.* **Silicone insulated, glass braided, Neoprene sheathed,** *right.* **Johnson and Phillips Ltd.**

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There are already various US Specifications for synthetic rubbers in cables. Their equivalent to BS 7 is ASTM D1350. There are a number of material specifications for various grades of natural rubber compounds and also for neoprene as in the UK. In addition, ASTM D1352 is a specification for ozone-resisting butyl rubber insulation; ASTM D866 is a GR-S (now SBR) sheath and ASTM D754 and 755 are two types of 'synthetic rubber' insulations. The normal type of insulation used for these last two is SBR.

As far as SBR is concerned the US has tackled the matter in rather a different way to the UK. In BS 2899 although a proportion of SBR is allowed in the general purpose sheath no concession is made for this in the tensile strength value. In the US the specifications are for the use of synthetic rubber only and allowance is made for the difference between natural rubber and SBR compounds. For example, the tensile strength of a heavy duty natural rubber sheath (ASTM D532) is 3,500 psi, whereas that for SBR (ASTM D866) is only 1,800 psi.

We will probably be adopting the US method for butyl and silicone rubbers, but not necessarily for SBR. The difficulty lies in the fact that psychologically, if the customer has to choose between two products of different tensile strengths, he will presumably choose the one with the higher tensile strength. This will not necessarily give the best product. The problem of a separate specification for SBR compounds or one where the polymer is used as an alternative to natural rubber in the same specification has yet to be resolved.

Testing

The tests required and the methods of test are laid down for cables in BS 2899 although this refers back to BS 903. Many other cable specifications refer to this. Except where otherwise stated any test results given in future articles will be in accordance with these specifications.

Compared with tyres there are various test differences. Some are obvious; for example insulation resistance, ozone resistance and fire or flame resistance are not generally required in tyres and most of the dynamic tests for tyres are not required for cables. There are also some differences in testing techniques which arise out of the available test pieces. As far as possible, the whole insulation is used as the test piece, and only in the case of larger cables are dumb-bells cut. There are wide differences in tear test methods and, in comparing results from different industries, great care must be exercised.

Two more important differences are in the type of result used. It is more normal in the tyre industry to speak in terms of the modulus at 300% elongation, whereas in the cable industry it is usually 200%. Again in ageing tests the tyre industry uses 70°C. as the ageing temperature, whereas the cable industry still uses the awkward 82.2°C. (180°F.).

If the cable industry is characterized by specifications, these specifications are characterized by ageing tests. The cable industry places far more reliance on the value of accelerated ageing tests as a guide to service than the tyre industry. Any rubber cable laboratory will, therefore, be found to contain many ageing ovens. It is certainly true that one of the major interests in many raw materials is the temperature at which they will operate. With materials ranging from natural rubber to Viton, this means that a series of ageing ovens is required with temperatures from 70°C. ranging up to 300°C.

The object is to age any new

Typical silicone cables. Silicone insulated, aluminium sheathed, *left.* **Silicone core,** *centre.* **Silicone insulated, glass braided, Neoprene sheathed,** *right.* **Johnson and Phillips Ltd.**

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materials, whether they be polymers or compounds, over a temperature range. For purposes of interpretation it is generally considered that a compound is of no further use when it has an elongation at break of 50% or below. Therefore, one has to find the temperature at which, in theory at least, this elongation is never reached. One then has the continuous operating temperature of the material.

The Requirements

The reason for the number of different raw materials used or examined by the cable industry is better understood if something is known of the requirements of cable users. These clearly vary considerably according to the application but some general principles may be laid down.

One of the reasons for examining new materials is to obtain improved heat resistance. Rubber (or SBR) is rated at 60°C. for continuous operation, butyl at about 85°C. and silicone rubber at about 150°C., and although butyl rubber cables are not much more expensive than the natural rubber equivalents, silicone cables are. Frequently it is found that customers require a cable which will operate at 100°C. or 120°C. At the moment there is little option but to offer silicone rubber with the consequent high price. Clearly intermediate materials are required which are cheaper than silicone rubber.

Again efforts are always being made to extend the temperature range at both ends of the scale. Enquiries have been received for materials to operate at temperature extremes of +400°C. to −100°C.! Therefore, a search has to be made for products to help at both ends of the scale and some progress has been made in this direction.

Another important aspect of new demands on materials is that of fluid resistance. The days of resistance to 'oil' have long since gone and there are now many specialized lubricants for aircraft, for example. Frequently, the use of such subterfuges as nylon over the elastomer is employed, but this does not stop the search for new materials.

There are many other aspects of this sort which can be mentioned. Naturally a universal material is required which is suitable for everything, but at the moment the best combination of properties is all that can be achieved. It may be that ozone or weathering resistance needs improvement; that brighter colours which do not fade are needed; that better water or fungus resistance is required and so on. The material used for a particular job is usually lacking in some respect so that some modification of it, or a new material, will be better.

Another important aspect is, of course, processing. If any new materials can be used as process aids they are likely to be very welcome. High-styrene resins, for example, are likely to be of use in this connexion.

Another factor which nowadays looms so ominously over all the work of technologists is cost. Any new compounding ingredients or polymers which are likely to reduce costs (and nothing else) will receive a hearty welcome. Oil-extended SBR may be very useful in this connexion. But it is no good offering the industry high priced fillers, softeners or accelerators, etc., unless they are either going to help overcome various troubles or alternatively improve processing characteristics and reduce costs that way.

Butyl insulated, neoprene sheathed railway cables. Johnson and Phillips Ltd.

Summary and Conclusions

The cable industry is today using a number of synthetic rubbers in its compounds, some on a large scale, but some on a small scale. The materials are only being used where they have definite merits, but their use is growing.

Although the usage of some materials is only small, even this is useful. The cable makers can be regarded as a huge pilot plant where field trials are given to new materials. Out of the number of products examined, many will find no permanent place in industry, but the few adopted will contribute greatly to cable technology.

In future articles it is proposed to consider neoprene, butyl rubber, butadiene-styrene rubbers and resins and silicone rubber in some detail. The newer materials such as Viton and chlorinated butyl, as well as some of the lesser used well-established synthetics (such as the nitriles) will also be considered as their importance warrants.

Canadian Tyre Prices Cut

Tyre prices have been reduced in Canada. Goodyear Tire and Rubber Company initiated the reductions last week with cuts running to 15%. Dominion Rubber Company announced an average reduction of 7½% on all lines of tyres soon after, and other manufacturers indicated cuts would be made in the near future. The reductions could mean savings of more than $5 a tyre for motorists.

Mr L. E. Spencer, Goodyear president, said that increased volume was one of the reasons for the cuts at this time. Another was that the company had experienced economies resulting from substantial capital investments in new and improved manufacturing, distribution facilities, and other general improvements.

On July 21 specifically, Goodyear, in the US, cut prices, and other manufacturers followed. The other manufacturers at that time were surprised in view of the fact that tyre sales were strong—running to 30% over 1958—and there seemed to be no particular reason for reductions.

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A.M.L.

Plastics Materials and Processing

PARIS CONVENTION—1

IN connexion with the 5th International Chemical Exhibition, Paris, June 17 to 29, there were a number of 'lecture days.' Two of these were devoted to plastics.

The proceedings were opened by M. L. Jacqué, President of the Research Centre for Plastics, Professor of Applied Chemistry at the Paris Polytechnic, and a well-known figure in French applied chemical circles. He said that there were only a small number of firms actually producing plastics, but many thousands who were using them. The number and variety of products was growing all the time.

Previously a new polymer appeared in every few years—now several appeared each year. Fabricators had difficulty in choosing the best polymer for any particular work for it was obvious that they could not rely on past experience; nothing could be known about the natural ageing of the new plastics. However, cooperation between the makers of plastics, makers of machines, and converters or users, could be very fruitful and the present series of lectures and the exhibition could help in this direction.

These facts were true not only for France but internationally.

Present and Future

Speaking on the 'Present and Future of Plastics,' M. P. Piganiol, general delegate in scientific research, said it was difficult when organizing research to keep one's feet firmly on the technical side and not to become entirely involved in administrative problems. He had tried to avoid this and would like to consider what were the main lines of progress and where they should be in 10 or 20 years.

Plastics had been used for their transparency and for their mechanical and electrical properties. Performance demands were becoming more difficult especially for aeronautics and ballistics where resistance to temperatures of 450 to 500°C. were needed. Developments here were therefore to be expected. Speed of production could be improved, in particular the time during which it was necessary to keep a plastic in the molten condition. The use of transparent plastics for research purposes such as the detection of strain might also be expected to increase. Desirable properties included low price, good quality, applicability with a wide temperature range, and possibly new physical properties, for example a carbon loading could be used so that electrical properties would vary with the pressure.

It generally took longer to develop the techniques and applications than to evolve the new polymer itself and new methods of investigation may be needed.

In the field of new polymers he would mention only polyformaldehyde, polyethers such as Penton to be described by Dr Cairns, and allyl derivatives which were just as easy to make as the corresponding vinyl derivatives and the numbers of which increased every day. He referred also to acrylonitrile which could be made directly from ammonia and propylene.

Fluorine Derivatives

Fluorine was the hydrogen of tomorrow and there were already a number of interesting new monomers of the following lines:

(1) Fluoracrylates

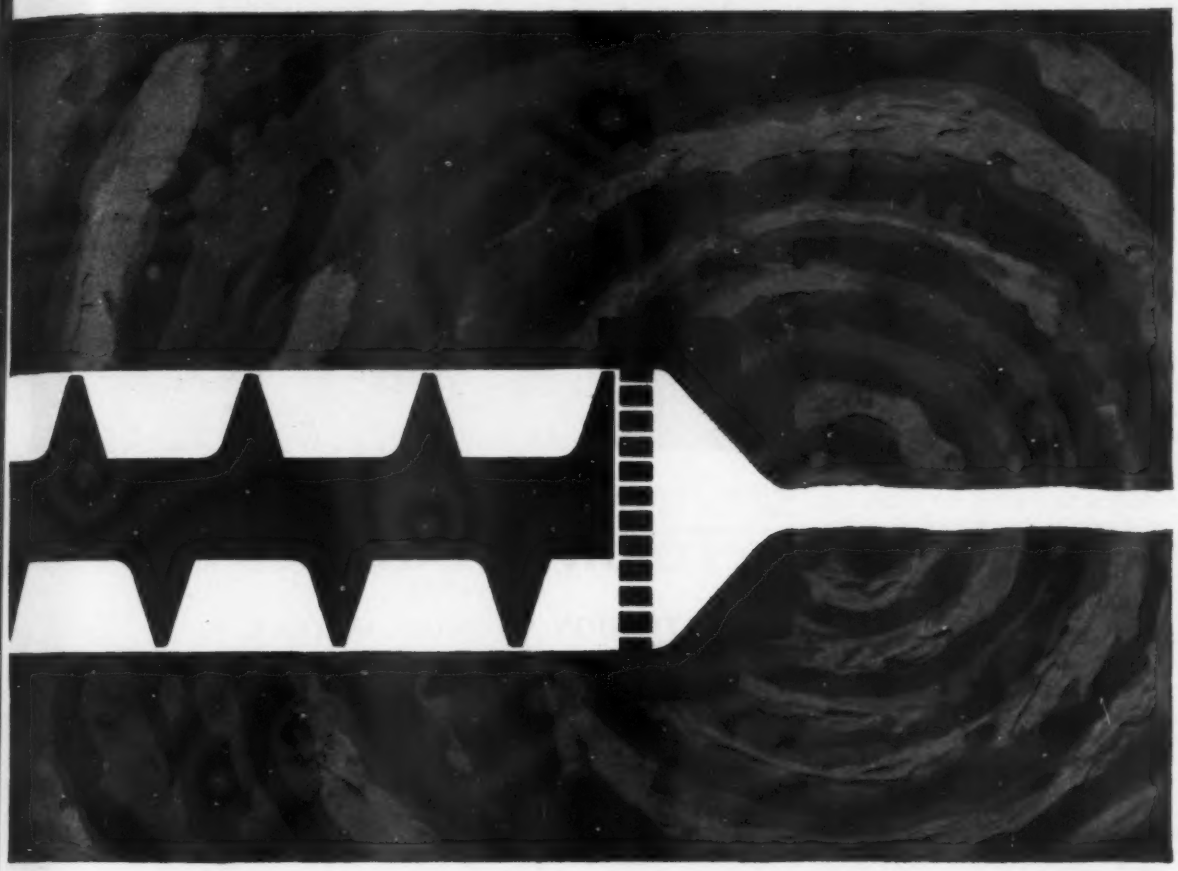
where R could be $CH_2.C_3F_2$ or $CH_2—CF_2.CF_2—OCF_3$.

(2) Glycols could give fluorine containing polyesters, example.

$$HO—CH_2—(CF_2)_2—CH_2OH$$

(3) Copolymers of fluorine such as Viton and Kel F were based on

$$CF_2 = CF \quad \text{and} \quad CH_2 = CF_2$$
$$\quad\quad | \quad\quad\quad\



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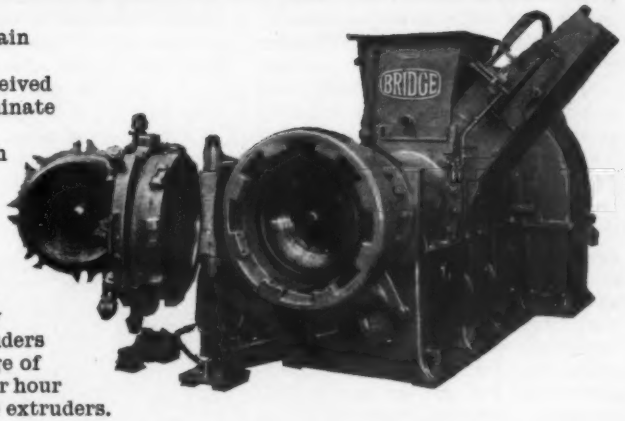

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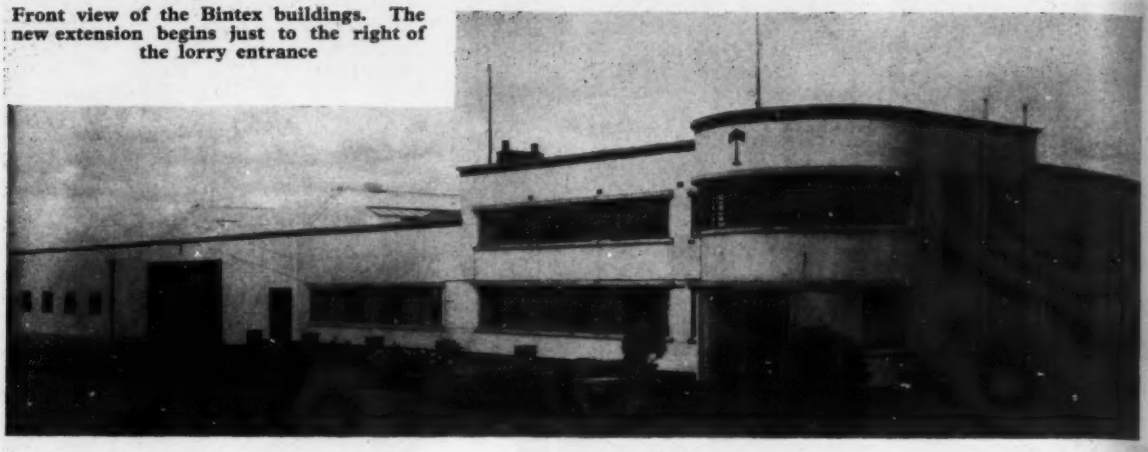


Front view of the Bintex buildings. The new extension begins just to the right of the lorry entrance

Latex Foam Products

BINTEX LTD. EXTENSION STEPS UP OUTPUT

AN insistance on top quality and a determination to ensure by every means that such quality is maintained is generally accepted as being one of the surest roads to ultimate success. These principles, together with an empirical technology second to none, have brought to Bintex Ltd. an international name in the field of latex foam products.

Recently, in September 1958, when it became apparent that demand would soon outstrip production, work was begun on a 28,000 sq. ft. extension to the company's Harrogate factory. That extension is now in full production.

Bintex Ltd., formed in 1938 and the second latex foam factory to be built in the world, has developed and manufactured latex foam products of every description. Since the war, however, the company has concentrated on a range comprising cushioning for upholstery manufacturers and for the car and general transport industry; mattresses and pillows. Most of the output goes into furniture and bedding, the remainder into transport. It is of interest to note that a passenger car can use up to 30lb. of latex foam.

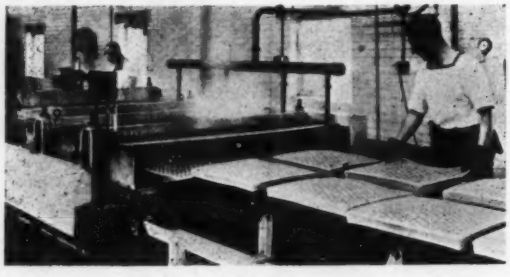
The new building has been designed in accordance with up to date industrial practices. Particular attention has been paid to employees' amenities, which include changing rooms with showers, steam extracting systems to improve the atmosphere, and bright colour schemes within the factory. The Company's belief that the provision of ideal working conditions evinces itself in the production tempo is quite clearly borne out in practice.

Plant operation is largely mechanical. Conveyors are used to bring most of the raw materials to the mixing department, and move the cured products from the dryers, through various finishing stages, to the loading dock. Mechanical handling of this type is essential, as the new factory is capable of producing more than 20,000 additional units per week. In the new factory special emphasis has been placed on maintaining a high standard of cleanliness. Every pillow, for instance, is triple washed before passing through the dryers to the special section engaged in covering the pillows and inserting them in Diothene bags. Another aspect of this accent on hygiene is the provision of space on the loading dock to allow even the largest vehicle to be loaded within the building, direct from the finishing conveyor. This arrangement not only speeds up the dispatch of products from the factory, but serves to protect products as they are being loaded; an extremely important consideration when dealing with latex foam.

An unusual feature of the work in the factory is that, for all processing jobs, measurements are metric. The convenience of the metric system has long been realized and it is interesting to learn, in view of fears always expressed when change from our obscure systems is mooted, that workers find no difficulty in learning and operating in centimetres, grammes, litres, etc.

Latex reaches the factory in insulated road tankers. The latex is tested before receipt and details of solids content, impurities and so on are forwarded. On arrival, for laboratory reference purposes, each test batch of latex is labelled with the name of the ship in which it was carried.

From the storage tanks, the latex is pumped to a pressure tank and from there, blown by compressed air, to the mixing tanks, each of which holds 1,000 gallons of latex. The ammonia is blown off and the latex stirred until it reaches the desired pH level when dispersions and



The washing machine. At this stage all products are triple-washed and squeezed

additives, which must be negatively charged, are added.

In the new building, two conveyors stretch across one end, starting from the continuous frothing machines. These machines were made by Bintex engineers and give a highly consistent mix. To these comes the matured mix through refrigerated pipes (10°C) from the mixing tanks. The mix then enters the frothing head which operates with rotors and a controlled and known quantity of compressed air. The frothed mix then passes through a blender where zinc oxide and sodium silico fluoride are injected by two hypodermic needles situated in the top of the blender. These two additives—one causing coagulation and the other a bubble-bursting effect—help in the gellation process prior to vulcanization. The process must be carefully controlled, and it is here that much of the technique of manufacture comes in. The mix, now known as a wet froth concentrate, is then piped into the moulds which proceed along the curing conveyor to the curing chamber.

At the far end of the conveyors the cured products are removed from the moulds and along with products from the batch units, are conveyed through a washing machine and pressed damp-dry by the washing machine rollers.

For batch mixing, the latex mix is frothed in a large bowl by a metal whisk until the required consistency is achieved, and is then poured into the individual moulds via a valve in the base of the bowl. When the moulds are filled, the cowl of the unit is placed over them and the steam turned on. The curing process on these units takes about 20 minutes.

After damp-drying, products are put into drying ovens where they are thoroughly air dried at high temperatures. The maximum moisture content worked to is 0.2%.

On leaving the dryers, the finished products are trimmed, and inspected before being passed to the finishing department for completion. In this section, reversible cushions and pillows are assembled, and tapes and scrim added where required, the finished product then being conveyed to the dispatch bay.

New type frothing machines are shortly to be installed to meet the greater demand for latex foam products. A feature of these machines which gives fine control over foam density, is the speed with which the foam is produced from the latex.

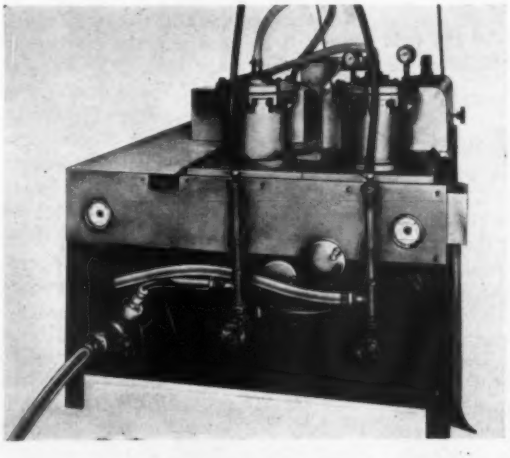
Strict analytical control of raw materials, mix and finished products is maintained in a comprehensively equipped laboratory. Extensive experimental work is also undertaken here, including some tests on various synthetic rubbers, although only pure natural rubber latex is used in the Company's products. Laboratory tests include 'hardness' testing, in which products are compressed to 60% of their vertical measure. The effort required to achieve this compression is described as the 'hardness' and is represented by an arbitary figure. Typical hardnesses are 7/9 for a pillow; 26/32 for a mattress and about 45 for a transport seat. Another testing device gives products 250,000 'bumps.' A product must not lose, as a result, more than 20% of its resilience.

Each of the Company's product types is engineered specially for a particular job and all moulds, whether for standard products or special requirement, are designed in the Company's design department, which also carried out prototype hand-building. In this department, various core layouts have been developed. Such layouts differ, for instance, in transport seating and chairs, in mattresses and in reversible seat cushions. For the latter, a feature is the graduated compressibility by which the cushions are soft at the centres and firm at the edges. Pillows are made from a light density foam and, again, have their own specially designed core.

Core designs are carried out first in wooden mould patterns, made from Canadian pine, which are then used to construct sand moulds. These are filled with molten aluminium to produce the final mould. It is interesting to note, the problem of heat transfer being critical, that the density of foam governs the amount of aluminium used in a mould.

The Company employs a total of 360 people and three shifts are worked, including Saturdays and Sunday nights. Export business, mainly pillows and mattresses, is mostly to Middle East countries, to East Africa and the West Indies. The bringing into production of the new extension—there is space for further expansion up to 30,000 sq. ft. —is one sign of the success of the forward-looking policy of the Company. Another sign of good and far-sighted management is the friendly team spirit of the highly co-operative labour force.

Conveyorized making up where two part products are joined and skirting and taping, etc. are carried out



Continuous frothing machine which delivers a constant quality of frothed latex

Rubber and Plastics in South Africa

THE 1958 report of the General Tire and Rubber Co. (SA) Ltd., reveals a decrease of the consolidated profits from £216,840 to £173,550 before taxation at £60,084 (£71,237). The dividend has been maintained at 7½d. a share. During the year under review the company made arrangements with the Goodrich International Co. to produce tyres and for export to African markets which were previously served by the Goodrich plants in overseas countries.

Dunlop South Africa

Explaining a lower net profit in line with restricted trading activities in South Africa generally, the chairman of Dunlop South Africa Ltd., states that there has been a marked slackening in the tempo of vehicle assembly programmes. In addition, during the earlier period of relaxed import control, the tyre industry enjoyed no benefit from the correspondingly increased number of fully-assembled European cars which arrived with tyres fitted in their countries of origin. Although it seems unlikely that there will be any speedy recovery to the former level of prosperity enjoyed by the motor trade, the directors' confidence in the long-term future of South Africa remains unchanged. The 10% dividend on ordinary shares in 1958 was a drop from the 15% of 1957, requiring £375,000. In 1958 the net profit after taxation was £306,063, against £478,407 in 1957.

Goodyear (SA)

Goodyear Tyre and Rubber Co. (SA), Ltd., showed a net profit of £433,409 after taxation at £230,000, as against a net profit after taxation of £539,549 in 1957. After the preference dividend of 5% was paid a dividend of 18% was paid to the ordinary shareholders, requiring £258,563. The carry forward was increased from £2,241,534 to £2,374,684. The directors said that the lower level of activity in the industrial, commercial and agricultural fields throughout South Africa during 1958 had a detrimental effect on profits. The expansion programme commenced in 1956 has been completed, resulting in a net increase of £330,360 in the value of fixed assets, compared with £586,602 in 1957.

Rubber Underlay

The Wayne Rubber Co. (Pty), Ltd., 219 South Coast Road, Durban, are making a $\frac{3}{16}$in. thick rubber underlay for carpets. It is bonded to rubber impregnated hessian to provide permanent protection. A similar underlay $\frac{1}{4}$in. thick is being made for the upholstery industry.

Utrilon for Footwear

Pretoria Industrial Plastics (Pty.), Ltd., Stephen Street, Pretoria West, are using Utrilon plastic compound to extrude increasing quantities of footwear, especially sandals. This company is also producing Netlon extruded mesh and a variety of other plastic products, the range of which is increasing with mounting demands.

Plastic Cables

Telcon Africa (Pty.) Ltd., manufacturers of plastic insulated telephone cables, are now working in partnership with African Telephone Cables (Pty.) Ltd., under the style of African Telephone Cables (Plastics) Ltd., at Wadeville, Transvaal. The products of the British company, Telegraph Construction and Maintenance Co. Ltd., made in South Africa, will still be sold under the Telcon trade mark. There is an increasing demand in South Africa for plastic insulated telephone cables.

Glass Fibre

Prodorite (SA) (Pty.) Ltd., Johannesburg, are providing local industries with a variety of glass fibre reinforced plastics, undertaking the fabrication of linings, ducting and similar equipment in such plastic materials as PVC and polythene and also a variety of glass fibre mouldings. The demand for glass fibre reinforced plastics has developed rapidly in the past four years, especially in the chemical industry. This firm is also interested in the production of glass reinforced corrugated plastic sheeting and in the manufacture of plastic dinghies and canoes.

IRI Philblack Visit

MEMBERS of the South Wales and Monmouthshire Section of The Institution of the Rubber Industry paid a visit recently to the carbon black factory of Philblack Ltd. at Avonmouth. The party, the visit was intended mainly for student members, assembled for lunch in the Staff Canteen and was welcomed by Mr Jennings, general works manager, who briefly outlined the history of the factory. After lunch, Mr Allan of Philblacks who was responsible for the arrangements, described the processes of manufacture before the party was equipped with protective clothing and split up into small groups, each with a guide for the tour of the works.

Four sets of plant were in operation, each making a different grade of furnace black, the 'old' plants Philblack 'O' and 'A' and the 'new' plants 'I' and 'E.' Features which were particularly impressive were the large quantities of oil used, enough, it was said, to keep a tanker in continuous service to and fro across the Atlantic; the high degree of instrumentation, there being as many as six automatic recorders per reactor in the 'new' plant keeping continuous records of temperatures, pressures and the flow rates of oil and compressed air; the fine central control panels; the absence of a dust-laden atmosphere in the bag-filling section, and the barely discernible smoke from the stack where waste gases are at present burned. The cleanliness of the waste gases was attributed to the efficiency of the final filtration process through glass/fibre bags. Shortly, however, the filtered gases, instead of being burned to atmosphere are going to be used in an electrical generating plant which is nearing completion and will supply power for the works.

A visit to the laboratories where the raw material is tested before use and the waste gases are analysed, as well as the finished product, completed the tour. The more important tests on the blacks are carried out after compounding into a standard tyre-tread type mix which is examined for Mooney, hardness, resilience and abrasion resistance in addition to the usual tensile properties.

After a clean-up using the excellent washing facilities available to the factory personnel the visit ended with tea. Altogether a most interesting and worthwhile visit leading to a better understanding of the manufacture of probably the most important single material in the rubber industry after the polymer itself.—G.D.G.

Mr Frederick G. Law has been elected a vice president of the Columbian Carbon Co., it has been announced. Mr Law is president and a director of the Fred'k H. Levey Co. Inc., a wholly owned subsidiary of the Columbian Carbon Co. In addition, he is a director of the Columbian Carbon Co.

softly as on a cloud....

DIANA, goddess of the chase, and obviously one of the early woman drivers, might well have been comfortably at home running a chariot on the puff-ball clouds of Olympus. How this unsprung, wooden-wheeled conveyance would have fared on the roads is another matter. It was John Boyd Dunlop who, on more earthly levels, came to the rescue of the modern counterpart of the chariot. He invented the first practical pneumatic tyre. Since then the company 'J.B' helped to found has pioneered the development of natural and synthetic rubbers, produced tyres for practically every form of wheeled transport, made the world go faster . . . in greater comfort, safety and efficiency. Yet the development of tyres is still only part of the world-wide research and production which Dunlop applies to world needs

DUNLOP makes things better for everyone

CPH/PR58/9

International Plastics Convention

2 — RECENT DEVELOPMENTS IN GLASS-REINFORCED PLASTICS

THE capacity audience at this session of the Plastics Convention, held in conjunction with the International Plastics Exhibition at Olympia, London, June 17-27, was able to survey a large part of the international scene by listening to speakers from Europe and the US. Dr Tunteler of the TNO Institute at Delft described developments in the Benelux countries. Dr Kraft of Chemische Werke Hüls spoke of the situation in W. Germany and Mr Menton, of the Owens-Gorning Fiberglass Corp., reported on the States. Finally, Mr Brian Parkyn of Scott Bader and Co. Ltd., considered changes in this country within the last two years.

All the speakers regarded the future of glass-reinforced plastics with great confidence but this was tempered by a realization that estimates made in the first flush of enthusiasm several years ago were a little too optimistic. Dr Tunteler, for example, reported that the original financial expectations in Benelux had not materialized and Dr Kraft found that this field of plastics had expanded less rapidly than expected. Nevertheless, Dr Tunteler anticipated a period of more rapid growth which would be based on decline in the price of raw materials.

Few of the developments in the field of reinforced plastics had originated in the Benelux countries but as from 1950 they had been forging ahead and producing most of the raw materials, *e.g.* maleic and phthalic anhydrides and glycol locally. Glass fibre was the only practically important reinforcement.

Hand Lay-up

Most of the products were made there by the hand lay-up process and typical applications include boats, car-bodies and building components. High hopes were placed on the future in this last field of development. A new feature in boat building involved the use of intermediate layers of honeycomb material in a sandwich of polyester glass fibre. Decks and cabin tops exhibited an increased stiffness when made in this way. There was a great need to accelerate the hand lay-up method and infra-red heating was used to speed things up.

Matched moulds with preforms were used in the Benelux countries for the production of lampshades, radio-cabinets and flush tanks, while one Belgian firm produced corrugated sheet by means of a continuous moulding technique. Dough moulding was becoming rather popular in the production of articles for the electrochemical industry.

Dr Tunteler mentioned a new development in the production of low pressure phenolic laminates, which could be cured at low or even room temperatures. They could be processed with glass or asbestos to give materials with high chemical and heat resistance. The price of these contact phenolics was less than that of the polyesters.

Dr Kraft speaking for W. Germany said that though some work in the field of glass-reinforced plastics had been done as far back as the 1930's serious developments started in the early part of this decade. Much of this progress was based on US experience. In fact a rather special situation existed in W. Germany in that only two companies were operating in this sphere and they were based on licences granted by a US firm.

Polyester resins dominated and epoxides were used only when polyesters proved inadequate. Some melamine was used with glass fibre and silicones resins came into the picture only in very special instances when their very high cost was justified.

In 1957 the W. Germans produced about 3,000 tons of glass reinforced plastics. This was expected to rise to 5,000 tons in 1959. These were, of course, quite small figures when viewed against gross plastics output.

Conventional Uses

The glass fibre was used in the various conventional forms and the raw materials for the polyesters were also usual. Styrene was employed almost exclusively as the cross-linking agent.

Dr Kraft described some standard tests for non-flammability which seemed very stringent to some of the audience. In fact one of them wondered how many materials would pass these tests.

Mr Denis Menton, who read the paper for Mr Blankmeyer, on the situation in the US was rather less inhibited in his claim for glass fibre plastics than the two earlier speakers. A new high was reached in 1958 and 1959 saw capacity being taxed in spite of the current recession. With the right sort of publicity reinforced plastics had become competitive. As he saw it, the crucial steps had been to correct and make good deficiencies in engineering data so as to instil confidence in engineers who would feel happy in specifying these materials. To this end the producers had made available appropriate articles, manuals and slide rules. Thus the new resin technology was becoming known and the laminates which two or three years ago were thought to be in decline were climbing again. Epoxies had grown but polyesters had developed still further.

High temperature resistant polyesters were still required by the military authorities and acrylic modified materials were being introduced.

UK Output Doubled

Mr Brian Parkyn approved Mr Menton's assessment of reinforced plastics developments and pointed out that output in the UK had doubled since the last Plastics Convention in 1957. Many technical improvements had taken place since then, in all aspects of production.

For example there was now a much greater batch to batch uniformity in the resin, as a result of the much livelier appreciation of the effects of those impurities. Though benzoyl peroxide was still the most widely used catalyst newer systems had been developed which made it possible to select the right catalyst for the particular job. There had been the improvements in glass fibre which Mr Menton had referred to.

More experience had been gathered in the matter of ascertaining the degree of cure and while it was still true that no single simple test could be relied on, the results from a series of tests could be evaluated with some confidence.

Mr Parkyn seemed to contemplate the reinforced plastics industry as a band of brothers, or a friendly club, dabbling in a difficult but rewarding task. He felt that at least this brotherhood now knew where it was going and exhorted it, with a 'clarion call of encouragement,' to make the world sit up.

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VULCAN 3 HAF
VULCAN C CF
VULCAN SC SCF
VULCAN XXX SCF
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VIEWS and REVIEWS

'The Annual Report'

THE *Annual Report*—the 22nd—on the *Progress of Rubber Technology* issued under the aegis of the Institution of the Rubber Industry* has once more appeared, on this occasion reviewing the happenings of the year 1958.

The present report is on the same general lines as those which have been much appreciated in past issues,† although to my mind two points, or rather trends of emphasis, are apparent. *Firstly*, the increase in emphasis on technological rather than on purely scientific matters; on manufacturing details rather than on the underlying fundamentals, and secondly, the—as it seems to me—greatly increased emphasis on *manufacture* in the section on synthetic rubber. The latter development obviously reflects the ever-increasing importance of the synthetic rubber industry.

There is so much useful detail in the Report that it becomes difficult to refer to specific matters, but an exception may be made by drawing attention, in connexion with the manufacture of synthetics to the apparently increasing complication of the patent situation relating to some of these, as detailed in the Report. Another point of detail to which one may refer is the continued interest in the development and manufacture of Foams, and also of the Polyurethanes. Finally, to refer once more to the growing importance of the synthetic Elastomers, it may be pointed out that the number of references in the Section on this subject amounts to 173 as against 100 for 1957.

Processing of Synthetics

The May 1959 issue of *Rubber Age* publishes a useful and interesting paper presented before the Division of Rubber Chemistry of the ACS, at Chicago in September of 1958. The paper in point 'Laboratory Processing Properties of Two Synthetic Polymers' (*loc. cit.*, 253-258) is by K. C. Beach, L. F. Comper and V. E. Lowery (Goodyear Tire, Akron), and arises out of the present trend towards shorter Banbury mixing cycles which, as the authors put it, 'has resulted in the need for a more critical appraisal of the mixing properties of synthetic rubbers.'

The authors give reasons for the view that Mooney viscosities and visual observation are not satisfactory for the appraisal desired. In the case of the latter (*i.e.*, visual observation), for example, Banbury mixing properties of specific types of SRs 'have only been valid enough to classify them into easy or poor processing types.'

Previous Work

In the past (*refs. given*) Jones and Snyder used laboratory Banbury power curves in mixing studies carried out on zinc oxides and rubber, and Gale, Harris, and Kilbank (*Trans. IRI 1957*, 33, pp. 33-57) reported on a test for rating factory processing properties of oil-extended styrene rubbers. This test was based on changes in power consumption during laboratory mixing of an HAF reinforced compound containing the rubber to be tested. This latter work, the authors of the present paper state, was used as a basis for extensive studies in their laboratory on power curves obtained during Banbury mixing of reinforcing furnace black-styrene rubber, and of acrylonitrile-butadiene rubber blends.

Experimental

In their experiments (*cf. paper for details and curves*) the power consumption curves—relating to the Banbury mixing of reinforcing blacks with the rubbers were used to—

1. Compare Banbury mixing characteristics of representative types of styrene and of acrylonitrile rubbers.
2. Compare the effects of various rotor speeds, ram pressures, and batch sizes on rate of pigment incorporation by an oil-extended styrene rubber.
3. Compare rates of mixing of various carbon blacks in an oil-extended styrene rubber.
4. Illustrate use of the power curves as an aid in evaluating effects of polymerization variables on Banbury processing properties of a rubber.

(Experimental evidence includes 8 Tables and 6 Figs.)

Conclusions

(*Abbreviated from Original.*) The authors found that Time of Incorporation and equivalent dispersion states of the furnace blacks in the rubbers mentioned can be accurately gauged from the laboratory Banbury power consumption curves, and that the latter are typical and reproducible for the various types of the styrene and acrylonitrile-butadiene rubbers. The curves are sensitive enough to distinguish minor differences in black pigment incorporation times between various lots of a specific type of rubber.

The Banbury black incorporation can be used as a rapid test for screening experimental rubbers as regards processing, and as a quality control test on styrene rubbers in the polymer factory.

Oil and Chemicals

The 'Survey of Activities 1958 of the Royal Dutch/Shell Group of Companies' is represented by a beautifully produced brochure of 43 pages (*ca.* $10\frac{1}{2}$ *x* $7\frac{1}{2}$*in.*) with a number of artistic in-colour illustrations.

The greater part of the brochure covers the happenings and developments of the direct oil interests of the Group, but there is an eight-page section dealing with Chemicals and Research.

* Published by W. Heffer & Sons Ltd., Cambridge, England, for the Institution of the Rubber Industry, pp. 110 + Name and Subject Indexes, + Contents Table and Foreword. Price £1 5s. 0d.: Offices of the Institution, 4 Kensington Palace Gardens, London, W.8.

† But it does seem a pity that the section on 'Cables and Electrical Insulation' had to be omitted on this occasion.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

Chemicals

In the first paragraph of 'Chemicals' it is mentioned that 'The Group is the largest producer of synthetic solvents and one of the largest suppliers of raw materials for the manufacture of synthetic detergents. It is also actively engaged in the manufacture of plastics and synthetic rubber which is expanding with great rapidity.'

The growing importance of the Group's chemical business 'is reflected in the number of plants as well as in the tonnage produced, both of which have risen nearly five times since 1949.'

A Moral

In the latest annual 'Review' of I.C.I. (also commented on in this page recently) it was observed that 'Alkylamines and derivatives of phenol—production of both of which is growing—are now virtually the only Divisional products (*i.e. Heavy Organic Chemicals Division.*—P.S.) that are not derived from petroleum. The Billingham/Wilton complex now makes from oil or its derivatives an integrated range of products such as solvents, detergents, plastics, and fibres. . . .'

A moral, of course, of the preceding paragraph seems to be: more research on the one raw material we possess in vast quantities in this little island, namely *Coal.*

The various fields of research developed by Shell will also be found discussed in the 1958 Survey. In the 'chemicals' area it is mentioned, *inter alia,* that 'A great deal of effort has been directed to research on the performance of polyethylenes and polypropylenes. In the Group laboratories in the United States important progress has been made with work on synthetic elastomers. Improved liquid detergents and a promising new base material for detergent powders have been evolved.'

Ageing

A paper presented to the Congress held by the Deutsche Kautschuk Gesellschaft in Cologne in May 1958 and of which the original text was published in *Kautschuk und Gummi* (11,332 *WT,* 1958) is by Dr Jean Le Bras (*Institut Français du Caoutchouc*), which appeared (in French) in *Revue Générale du Caoutchouc* (1959, 36, No. 1, 80-84), and of which a translation has now been published in the latter journal in English (*February* 1959 *issue, 231 et. seq.*) under the title 'New Considerations on the Problems of Ageing of Rubber.' This is a paper which should be studied in the original.

Conclusions and Prospects

A summary, under the above heading (*English version*) is as follows:

'From the foregoing it would seem that the main characteristics of ageing phenomena in vulcanized rubber can be explained by a logical overall interpretation, on the understanding that:

—they be considered from the point of view of the degradation of a network having points of attack of different nature,

—due account be taken of factors capable of causing the creation of new cross-links.

Experimental Methods

The principal experimental methods, according to the view expressed by Dr Le Bras, on which one can rely at present are, *firstly,* continuous and intermittent relaxation measurements, as these provide information about scission and cross-linking taking place in the vulcanizate and, *secondly,* maximum swelling determinations, which furnish information about the degree of cross-linking.

Coming to the chemical nature of the cross-links, 'only somewhat uncertain analytical means are available at present.' However, the author thinks that some improvement in this direction can be expected, and 'in another respect, our constantly widening knowledge about vulcanization and vulcanizing agents should, as in the case of the bisazodicarboxylates, make it possible to work on vulcanizates the structures of which are known beforehand.'

Finally, Dr Le Bras sketches a programme of research which might be undertaken with a view to progress in this field.

PHILIP SCHIDROWITZ

RUBBER MERGER PROPOSALS

Proposals for the merger of the Kuala Lumpur Rubber Company, the Jeram Rubber Estates and the Tamiang Rubber Estates have been sent to shareholders with recommendations for acceptance by the boards of the three companies. To effect the merger, Kuala Lumpur has offered to acquire the whole of the issued capitals of the other two companies and also the convertible debenture stock of Jeram on the following bases: 1. For every 15 shares of 2s. each in Tamiang one KL £1 share plus 9s. 4½d. cash. 2. For every 15 shares of 2s. each in Jeram two KL £1 shares. 3. For every £3 convertible debenture stock of Jeram four KL £1 shares.

In the event of full acceptance of the offers, Kuala Lumpur's issued capital will become £1,247,883 with 22,317 acres of planted rubber. Of this total 16,449 acres (74%) are planted with pedigree rubber.

Estimated production for the financial years of the three companies is in excess of 12m. lb. and it may be confidently expected, it is stated, that production will steadily increase in ensuing years as the present immature areas come in bearing.

It is also pointed out in circulars to members of Jeram and Tamiang that by accepting the offers they will hold shares which should have a freer market, particularly as Kuala Lumpur's shares are quoted on the Paris and Antwerp Exchanges as well as on the London and Glasgow Stock Exchanges.

In the meantime, Kuala Lumpur announces an interim dividend of 1s. per £1 share, free of tax, and Tamiang 1.8d. (7½%) per 2s. share, free of tax, Jeram paid an interim of 3d. per 2s. share, less tax.

The new KL shares to be issued under the offers will not rank for the interim now declared, but will be entitled to the final dividend of 7½%, tax free, which it is hoped to pay.

Issued capitals are: Kuala Lumpur £685,665 at June 30 1958; Tamiang £131,816 at September 30 1958; and Jeram £233,230 at March 31 1959, and £122,526 convertible debenture. Kuala Lumpur shares were quoted at 32s. recently, Jeram at 3s. 11¼d. and Tamiang at 2s. 4¼d.

Questions Corner—79

(Second Series)

335. Is it essential to use nylon thread when producing articles from nylon fabric?

336. After the beads have been formed in 'pearl' polymerization it is sometimes necessary to give them certain treatments. What are they?

337. Give some of the properties of ethyl cellulose.

338. What does the term 'solvent balance' mean when applied to the formulation of nitrocellulose lacquers?

(Answers next week)

Answers to Questions Corner—78

331. Polyvinyl formal, sold under the trade name of 'Formvar,' by Shawinigan, is prepared by the simultaneous hydrolysis and acetylation of polyvinyl acetate. There are various grades varying in the extent to which the acetyl groups have been replaced by hydrolysis. Each type is available with two grades of thermal stabilization, one a volatile stabilizer at high temperatures (E) and the other a non-volatile stabilizer (S).

Type 15/95, indicates a type in which Gelva 15, polyvinyl acetate resin, has been used in the preparation and the '95' the extent to which the acetate groups have been replaced by hydrolysis. This type is a material of high viscosity and very limited solubility and it is used for magnetic wire enamels and for bonding metal to metal.

Type 7/95, on the other hand, is of medium viscosity and is used as a moulding powder in injection moulding.

Wire coating with polyvinyl formals are usually applied by solution which contains a small percentage of phenolic resin, used as a cross-linking agent.

Polyvinyl formals are tough, rigid and dimensionally stable resins, with good electrical properties and oil resistance.

Property *Type*	15/95*E*	15/95*S*	7/95*S*	7/70
Viscosity (cps), 5 gm. resin/100 ml. ethylene chloride at 20°C.	40—60	40—60	15—22	8—10
S.g.	1.2	1.2	1.2	1.2
Water absorption, 24 hours, % ..	0.75	1.1	1.1	1.5
Tensile strength, psi × 10^3	9—11	10—12	10—12	5—7
Elongation at break, %	60	70	70	90
Impact strength (Izod), ½ in. × ½ in. notched	1.2—2.0	1.2—2.0	1.0—1.4	0.4—0.6
Heat distortion temperature, °C. ..	86—92	84—92	84—92	50—60
Flow temperature, °C. (1,500 psi) ..	160—170	160—170	140—145	—

Some of the properties of Formvar are given in the above table.

332. Methyl cellulose is formed by reacting cellulose with strong caustic alkali and forming an alkali cellulose, then reacting this compound with methyl chloride.

It is soluble in water but insoluble in all but a few organic solvents. It is more soluble in cold water than in hot water and as the temperature is raised above 60°C. the solution will gel.

For the preparation of a water solution it is recommended to first prepare a slurry of the methyl cellulose in hot water, with about one-third of the total amount of water that is required, and then when the cellulose is thoroughly wetted, dilute with the remainder of the water, but use cold water.

Methyl cellulose is used as one of the ingredients in water paints for the following reasons: (a) It has good viscosity stability during long storage; (b) it enables good pigment dispersion to be obtained; (c) it is cheap and easy to use; (d) the problems of pH control are easier, and this is of great value for those emulsions which tend to develop increased acidity on storage, *e.g.* polyvinyl acetate; (e) it improves the 'wet' adhesion and thus allows earlier recoating.

333. Pigmented nitrocellulose lacquers are essentially composed of four ingredients: (a) The film former; (b) plasticizers; (c) pigments; and (d) solvents and diluents.

There are numerous grades of nitrocellulose but two factors are employed in classifying the different types. The first depends on the percentage of nitrogen they contain, and is an indication of their behaviour in various solvents. The second depends on the variation in the viscosity of the solutions. The three main grades are: High nitrogen (11.8 to 12.3%), soluble in esters and ketones; medium nitrogen (11.2 to 11.8%), soluble in ether-alcohol mixtures; low nitrogen (10.5 to 11.2%), soluble in alcohol.

All these are obtained in various viscosities (concentration of nitrocellulose per 100 c.c. of 95 c.c. pure acetone plus 5 c.c. water): High, 3; medium, 10; low, 20; extra low, 40.

Other film formers and modifiers include soluble gums, *e.g.* ester, dammar and synthetic resins such as alkyds.

Camphor is used as a plasticizer for some applications of nitrocellulose but is not very suitable for lacquers. The main plasticizers used today include dibutyl phthalate, dioctyl phthalate, raw and modified castor oil. In some formulations the alkyd resin component also acts as a plasticizer.

These are required to give colour and hiding power to the lacquer, and soluble dyestuffs, coal tar pigments and inorganic pigments may be used.

The most important solvents and diluents are acetone, ethyl ether, ethyl acetate, emyl acetate, butyl alcohol, toluene, benzene, cyclohexanone, etc. The choice of solvent depends on the grade of nitrocellulose, the required application, any resin additatives and the method of application.

334. In an extrusion machine if the screw is of the correct design a screen pack is only necessary for filtering the material so that no foreign matter or unplasticized particles of the material pass through to the die. In practice, however, it is not possible to design a screw for each die so that the necessary mixing in the metering section of the screw cannot be achieved at the pressures obtained, and the screen pack, therefore, acts as a pressure mechanism in addition to acting as a filter.

Various mesh screens are usually used with the breaker plate and placed on the screw side so that the pressure of the material keeps them in position. A coarse mesh screen is generally placed next to the breaker plate in order to prevent damage to the finer mesh screens, which are made of stainless steel wire.

The breaker plate is part of the die assembly and consists of a round plate, the centre portion of which is pierced by a large number of small holes. The size of the holes varies according to the bore of the machine and may vary from ⅛in. to ¼in. in diameter. It is usual to countersink both sides of the holes to ensure uninterrupted flow of the material. The thickness of the plate also varies with the size of the machine.

(More questions next week)

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MEN and MATTERS

A Review of People and Events

by George A. Greenwood

A QUITE remarkable number of personalities in the various sections of the two industries has been in the news in the past week or two. Some of them, it is true, are better known than others, but nearly all of them are not unfamiliar to rubber and to plastics.

In the first place there is the news that Sir Owen Wansbrough-Jones is to become a leading figure in more directions than one as a full time director of Albright and Wilson as from October 1. It seems entirely appropriate that Sir Owen, at 55, should come right into the heart of the chemical and associated industries, for he is essentially a scientist, particularly on the chemical side, and although practically all his life has been spent either as a don or as a civil servant, he has for the better part of 30 years been closely in touch in one way or another with industry and commerce. At Cambridge, where he studied at Trinity Hall and had an open scholarship, he had a brilliant career, and later he studied in Germany. In 1940 he was given an emergency Army commission and for years specialized in chemical warfare and other scientific subjects. For the past six years he has been chief scientist to the Ministry of Supply and it is from that post he is retiring to go to the Albright and Wilson headquarters in Knightsbridge. I am sure he will be warmly welcomed by all who have known him in the past, and those who will come into contact with him in the future.

Another notable figure in this list is Lord Baillieu, President of the Dunlop Rubber Company, who is to become first President of the British Institute of Management. He has accepted the nomination of the Council for election at the annual meeting, in October, of the Institute, which was established in 1946. Nothing could be more suitable, for Lord Baillieu, then Sir Clive, was Chairman of the Committee introduced by the President of the Board of Trade in that year to prepare detailed proposals for setting up a central Institute for all questions associated with management and the establishment of the Institute was the direct result of the recommendation that the committee put forward.

A modest man.—Probably because he is such a modest sort of man more concerned with his work than himself, this great leader of industry and commerce is a stranger to the man in the street. Actually he is an Australian born 69 years ago and he has been on the board of Dunlop for just about 30 years. From 1945 to 1947 he was President of the Federation of British Industries and he is also deputy chairman of the Central Mining and Investment Corporation and a Director of the Consolidated Zinc Corporation, the English, Scottish and Australian Bank, The Midland Bank, the London and Lancashire Insurance Co., and other undertakings.

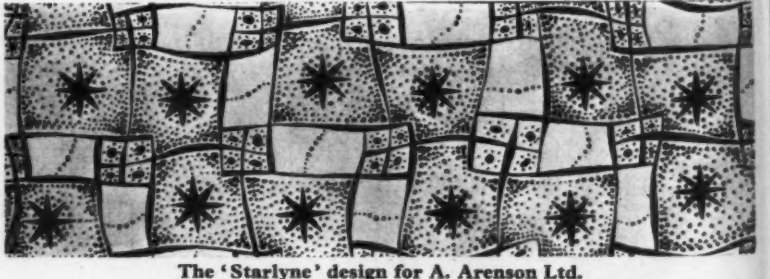
What is probably least known about him is that he is chairman of the English Speaking Union.

Turning to the rubber companies, it is a question of farewell—and hail. Sir Robert Wilkinson has resigned from the Board of Kulim Rubber Plantations, and his place there has been taken by Mr R. F. M. Wilkinson. Sir Robert, who will soon be 76, and is former deputy chairman of the Stock Exchange, is a prominent figure in the City where he has served in many capacities both executive and advisory. He was on the Departmental Committee on Fixed Trusts, the Foreign Transactions Advisory Committee, and the Departmental Committee on Share-Pushing, more than 20 years ago, but one of his most important tasks was to aid the Capital Issues Committee from 1939 to 1946. Incidentally, and more than 30 years ago, he was Master of the Needlemakers Company in which, I have good reason to know, he still takes an active interest. Like Lord Baillieu, he is a founder member of the British Institute of Management and he is, or has been, on the Boards of other rubber and tea companies.

Tale of a Design

Here is an interesting tale, and a true one, of trial, error and triumph in the realm of design, in which PVC plays a part. Two months before the last Furniture Exhibition, A. Arenson Ltd. (the manufacturers of Arvin furniture) contacted Storeys of Lancaster concerning a new design for printing on PVC leathercloth. Mr J. Nottage of Arvins had designed the two-colour pattern for use on matching upholstery and decorative laminate surfaces for a new range of kitchen furniture.

Storeys immediately commenced work on the printing rollers, which had to be the standard size of 18in. circumference. To ensure continuity of design a pattern must repeat an exact number of times within the roller circumference. Problems arose in reducing the original 'Starlyne' design (as it was called), both in the print register and in the alignment of the colours. The design section, therefore, had to redraw the spot patterns to ensure a satisfactory print at the production stage. After agreement with the designer, work commenced on making the printing rollers; this involved transferring the



The 'Starlyne' design for A. Arenson Ltd.

design by a photo etching process to a bare copper roller.

The production of satisfactory printing rollers was, however, only part of the story. It was essential that both the base colours and prints on the leathercloth exactly matched those on the melamine surface; added to which, the type of emboss used was another vital factor which could make or mar the final effect. Nine colourways were required, five on a white base and four on a pink. The objective was to match as closely as possible the colours of the laminate material. Samples of the two base colours only arrived a month before the Exhibition date. By the time the rollers had been completed, six colourways had been received; strikings were made and submitted for approval, and a length in one colour only was embossed in the two grains. It was then found that the design itself was not perfect, so the printing rollers were remade.

On Jan. 15 final details of the nine colourways were established except for the last essential colour sample which did not arrive until Jan. 19. The printers responsible submitted samples to Storeys' chief designer only to have them rejected time and again—the last colour was eventually established and printed on Jan. 20. As each length was printed, it was rushed to the embossing machines, and then on to the trimming, inspection, cutting and despatch departments, finally leaving Lancaster on Jan. 21.

Despite having only four days in which to make up the suites, Arvins had them on their stand forming a major part of their display at the Furniture Exhibition.

ASTM Presentation

Elmer G. Kimmich, chief engineer of industrial products developments, Goodyear Tire and Rubber Co., Akron, Ohio, was one of 13 men to be honoured at the ASTM 62nd annual meeting in Atlantic City, New Jersey, on June 23. Mr Kimmich's award was in recognition of 'outstanding and sustained service in ASTM technical work, especially long-term support of Committee D-11 on Rubber and Rubber-Like Materials, and for services in his ASTM district.'

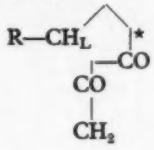
Dunlop France

Net profits of the French Dunlop Tyre Company rose sharply during 1958 to 460,386,851 francs from the 1957 total of 353,683,512 francs. The company has decided to propose an 8% dividend for the year.

PLASTICS MATERIALS AND PROCESSING

Continued from page 52

with reactivity at * but it could also give a cyclic polymer



Graft Polymers

Radiation ozone and electrolysis could be used for end grafting, but it had not yet been possible, for example, to improve the properties of cellulose acetate in this way. The effects were generally confined to the surface so that films and fibres were the main field. New textures were obtainable. Work in England had been carried out on the grafting of methyl methacrylate on to rubber. By adding a liquid which dissolved only one of the components two different types of material were obtained on drying out, the properties differing according to the solvent used.

New Techniques of Investigation

Electro Magnetic Resonance. This was most useful because it could show the structure of the radicals in a way that was not possible with X-rays. It showed, for example, the arrangement of benzene rings in copolymers of styrene; the internal friction of the molecule could also be measured.

Crystallization. The ordinary methods of dilatometry could be used and transmission points measured.

Viscosity. There were many theories of viscosity and they all gave viscosity curves with the same kind of slope. There was, however, an important difference between the initial effect of application of force and the effect after the force had been applied for some time. The difference between these two viscosities varied with different polymers.

The Future

They were now in a stage of development which must be described as experimental. They had ring molecules, and three-dimensional molecules, but as yet no flat molecules. Carbon and hydrogen would no longer be the predominant elements and it would be possible to control the actual structure so as to make semi-conductors. The French Government had assisted research by taxation relief but research costs remained, nevertheless, very high. The relation between Government and private research was very difficult to arrange but in the field of plastics great progress had been made.

Amongst subsequent questions, one speaker asked whether radiation was too costly to use industrially. The speaker agreed that with ethylene and for vulcanization this was probably the case, but for vinyl chloride the situation was more favourable. There was a constant struggle between physical and chemical methods. Another speaker asked for examples of materials which would not polymerize by themselves but would polymerize together. The lecturer said that a list had been published. It included fumarates or maleates plus isopropenyl derivatives and he referred also to tetrachlormethylene. In reply to a question as to how three-dimensional polymers were made the lecturer said the information could not be given. There was also a question about semi-conductors which were said to have been made according to a process developed by Eley in England. These were long chain polyaromatic or polythene polymers with conjugated double chains. The work here may be considered as an extension of the theory of colour.

Nigerian Rubber Exports

Nigerian rubber exports in February totalled 3,369 tons against 2,193 in February last year, according to statistics released in Lagos. Crepe exports in February totalled 1,297 tons against 1,132 in February last year.

British Estates Take Over

British estates in North Sumatra, whose concessions had expired, would be taken over by the Government, according to a reported statement by the North Sumatra Army Commander quoted by *Antara News Agency*.

Firestone Expansion Plans

Firestone Tire and Rubber Company has announced plans for a 55 million dollar expansion of its worldwide production facilities over the next 30 months. Its investment in the US will be 40 million dollars with the remainder going abroad. Included in the programme are two new plants, one in Alcochete, Portugal. Other foreign tyre plants due for expansion or improvements are those at Sao Paulo, Brazil, Buenos Aires, Valencia, Venezuela and Bombay. The company gramme.

Mr William Fraser has been appointed a director of British Insulated Callender's Cables.

Saturation Demand

RUBBER PRODUCTION AND CONSUMPTION

PRODUCTION of natural and synthetic rubber this year would be about 30,000 tons short of world demand, Mr James Bush, a spokesman for the Natural Rubber Industry Board, said in Kuala Lumpur recently. In a radio broadcast, Mr Bush said ' It is more than likely that saturation demand will continue for several years to come.'

World consumption of all types of rubber continued to climb. It was expected to reach four million tons in 1965. Between 1959 and 1965 there would be a deficit of 600,000 tons, a demand which could not be met by either natural, or synthetic to compete with natural rubber, though manufacturers claimed they could produce synthetic rubber equal in quality to natural.

He went on: ' If Malaya continues to replant at the same rate as she did in 1958, our production will be between 850,000 to 900,000 tons a year, a gain of 200,000 or 30% in just seven years, and this tonnage will have been produced at a considerably lower cost than today.

' It is generally agreed that for the next few years the industry will not be able to meet world demand for natural rubber and on a free market our production will continue to get very good prices.

' It is during these years that we must prepare for 1962 and onwards because it is then that synthetic natural rubber, if they can match nature's product, may be on the market in sufficient quantities to make their competition felt.'

' But,' Mr Bush continued, ' with a vastly increased tonnage of low-cost rubber there is little doubt that we can compete. Nature alone has provided a product that today remains the standard measuring stick for rubber quality. Nature plus science is making that product more comprehensive in use—more available in quantity—and when the market demands it, cheaper in price. It's a tough combination to beat.'

PECO OPEN DAY

The third of the Projectile and Engineering Company's Open Days (the last was in 1957) was held on July 7. Friends and relatives of Company staff, and employees and visitors were welcomed by Mr A. J. Chambers, managing director, and Mr E. L. Tuff, general manager. Visitors, free to tour the well signposted factory, were able to see not only the Company's wide range of finished products but also some of the impressive heavy machinery at work. With few exceptions, everything in the factory was on view. In the machine assembly shops, for instance, the complete range of plastics moulding machines was on show, some of them ready for export like the 50 MP 60 (60 oz.) injection moulding machine for Holland and the 40 MP 50 (50oz.) machine ready for transport to Africa.

Demonstrations included arc and spot welding of motor chassis parts —some 5,000 vehicles per week are produced by the motor industry from steel pressings produced by Peco— palletized storage, metal spraying and plate sharing. Somewhat different demonstrations included a variety of games and a very professional looking, but slightly harassed, clown in ' Kiddies Corner,' weight lifting and films on plastics machining.

WEST GERMAN PLASTICS

West German production of plastic materials increased by 21% to 244,000 tons in the first four months of 1959 compared to the same period last year, according to the West German Chemical Federation.

Imports totalled DM65.6m. worth of plastics, an increase of 25% over the same period last year. The US had a 46% share of these imports. Imports from Italy had increased by 30% to about DM6.5m. worth, followed by Switzerland with DM6m. worth, Britain with DM3.8m. worth, and Japan with DM2m. worth.

West German plastics exports, at DM206m., were 23% higher than in the first four months of last year and amounted to about 26% of total production.

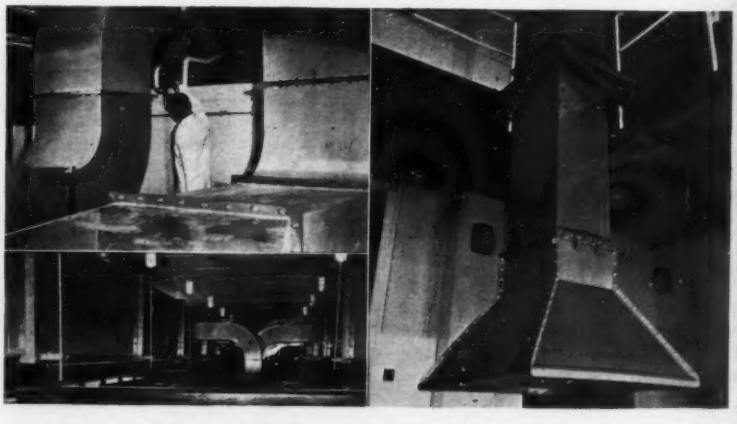
Europe was West Germany's main customer in plastics, but exports to Asia rose by 40% to DM18.2m. worth. The Netherlands took DM19m. worth in the period under review, Britain DM17.7m. worth, Italy DM17.1m. worth. Exports to the Soviet Union, at DM6m., compared with DM4.9m. worth in the same period of 1958.

Plastic Ducting

LABORATORY FUME EXTRACTION

A COMPLETE system of fume extraction ducting fabricated in Cobex rigid vinyl by Rediweld Ltd., Crawley, Sussex, has been installed in the National Chemical Laboratory at Teddington. Cobex is manufactured by BX Plastics Ltd., Chingford, London, E.4.

The laboratory block is constructed with a void above it in which all the services are contained, and here two main rectangular trunks, each approximately 150ft. long, have been fitted. These serve a number of smaller ducts from fume cupboards in the inorganic control laboratory and other laboratories, as well as extracting the fumes from two tanks in the Mineral Processing Laboratory by means of detachable hoods also made from rigid vinyl. The rate of extraction through each of the main legs over the Mineral Processing Laboratory is approximately 4,000cfm.



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IRI Golfing Society

WALLWORK CUP FINAL — HAWKSTONE PARK

THE Wallwork cup final of the Institution of the Rubber Industry was played this year at Hawkstone Park Golf Club, on June 5-9. Manchester Section were hosts to the London and Scottish Sections.

The team matches commenced on Saturday morning with the five Scottish members playing the Manchester members. An alternative competition for those not taking part in the match was a four ball Stableford. On Saturday afternoon, Scotland then played London, the alternative being a medal round. On Sunday a.m. London fielded the whole of their team against Manchester, the alternative being a single ball Stableford.

AGM

At the annual general meeting, held on Saturday evening, Mr Roy Cuzner announced his retirement as secretary to the society. It was known in advance that this would take place, and the opportunity was taken by the presiding chairman, Mr R. N. Ferguson, to present to Roy a silver salver from the members of the society to show their appreciation of his efforts over the past 10 years. Mr G. C. Swann was proposed and elected in his place and to take over the duties of hon. treasurer from Mr Wilfrid Smith, who also wished to relinquish his position.

Wallwork Cup

As announced in a previous issue, the previous year's winner, Mr T. W. W. Davie, again won the cup, playing on a reduced handicap of 6. His two nett scores were 70, making 140 for the 36 holes. The second place was taken by Denzil Davies, with a total of 145. The best gross score went to B. J. Newey with a score of 152. The second runner-up was Joe Ruffell, the London secretary, with a score of 147, followed by E. Ellery of London, with a score of 149. The best morning round was taken by B. A. Wallace with 72, Manchester, and the best afternoon round by R. L. Ferguson with 71. As a result of these placings, London took the Ferguson Trophy.

Team Matches

Scotland beat Manchester by 3 matches to 1, one match being halved, and consequently won the Ryan Trophy. Scotland halved with London, both winning two matches and halving one. Scotland retained the Drumnadrochit Cup. London beat Manchester by 8 to 3, two being halved, and won the Garner Trophy. Scotland therefore won the Franklin Trophy.

The Four Ball Stableford Competition played on Saturday was won by E. Cheetham and E. Ellery with a score of 41 points having one of the best gross four. D. Davies and L. McQueen were runners-up. On Friday, the Medal Round was won by H. K. Mills, the Manchester Captain with a nett score of 71. The Single Ball Stableford was won by W. Alexandre, the Scottish Captain with 31 points.

In the absence of our President—Howard Franklin, who had until the last minute expected to be with us, the usual dinner following the Wallwork Cup was presided over by Ronnie Ferguson, vice-president of the Manchester Section, who also presented the prizes.

The Captain of the Manchester section, Mr H. K. Mills, welcomed the members of the two other sections and said he would not like to blame the hospitality shown by the Manchester members to the visitors for being what he termed 'whitewashed' but there may have been something in it. The captains of the London and Scottish Sections both expressed their appreciation to the Manchester Section for their efforts in providing a most successful week-end.

Members of the IRI Golfing Society would like to express their appreciation and thanks to the donors of prizes:—Dunlop Rubber Co. Ltd., British Recovered Rubber and Chemical Co. Ltd., Whitehead Chemical Co. Ltd., Hubron Rubber Chemicals Ltd., Rubber Regenerating Co. Ltd., British Titan Products Ltd., Shell Chemical Co. Ltd., Anchor Chemical Co. Ltd., S. T. Diggle, and the following members of the Golf Ball Manufacturers Association: Dunlop Sports Co. Ltd., Golf Ball Developments Ltd., Slazengers Ltd., Spalding Brothers Ltd.

G.C.S.

The modular polyurethane foam producing machine illustrated above is manufactured by the Martin Sweets Co. in the USA. Incorporating a prepolymer and catalyst system designed for foam-in-place applications, the machine comprises: Newton head, mixing head, control and variable DC motor drive for the mixing head. It is stated that the material produced by the machine can also be sprayed by a hand sprayer to achieve up to a 2in. coating at any one spray pass

Amongst those who played in the Wallwork Cup competition of the IRI at Hawkstone Park on June 5-9 were the following (*P.* 70)**: 1.—S. Heywood and W. Alexandre. 2.—D. Davies, E. Pilbrow, H. K. Mills, W. Alexandre and P. Bell. 3.—D. Davies. 4.—J. Halstead and A. Whitehead. 5.—***top***, H. R. Cuzner, B. Cuzner, V. Jorey.** ***lower***, **K. Valentine and E. Pilbrow. 6.—A. Saunders and B. Wallace. 7.—A. Tonge and E. Ellery. 8.—R. N. Ferguson and D. Davies. 9.—B. J. Newey and L. McQueen. 10.—The winner, T. Davie. 11.—G. Betts, K. Manock, A. Whitehead and W. Alexandre. 12.—G. Swann, T. Davie, P. Bell and J. Gallie. 13.—***top***, A. Reid and E. Cheetham.** ***lower***, **G. Swann and F. R. Davis. 14.—A. Ayres and F. R. Davis. 15.—J. Pedley and G. Redfern.**

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IRI Golfing Society's Wallwork Cup Meeting (*details page* 68)

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Rubber Statistics

WORLD POSITION AT THE END OF MAY

THE latest published statistics make it possible to assess the world rubber position up to the end of May last. In the table which follows, natural rubber production during the first five months of this year is compared with production during the same period of 1958.

NATURAL PRODUCTION

	Jan.-May 1959		Jan.-May 1958	
Malaya:				
Estates ..	156½		146½	
Smallholdings	111		107	
		267½		253½
Indonesia:				
Estates ..	87		96½	
Smallholdings	188		91½	
		275		188
Ceylon		31		41½
Thailand ..		76		56
Sarawak		15		13½
Other British Borneo ..		9		8
Liberia		16½		15½
India		8½		9
Belgian Congo ..		15		14
Others		99		146
		812½		745

The above table shows a very considerable increase in production on Indonesian smallholdings compared with last year. On the other hand, the Secretariat of the International Rubber Study Group, from whose Bulletin these figures have been derived, recently amended its 1958 production estimates by including a figure of 86,000 tons for rubber which it described as 'not yet reported.'

Spreading this amount over the whole of the twelve months would result in some 40,000 tons being attributed to this period, and, on the supposition, which is probably well-founded, that this rubber mostly originated on Indonesian smallholdings, this would provide an explanation, in part at all events, for last year's low total. At the same time, the political situation in Indonesia has considerably improved during recent months and more settled conditions therefore probably also account for some of the increase in output. The improvement this year in the case of Malaya is probably attributable to recent replantings which are now beginning to come into bearing.

The following table shows the natural rubber consumption position for the period under review:

NATURAL CONSUMPTION

	Jan.-May 1959	Jan.-May 1958
UK	72	76
US	229	189½
France	60	59½
Western Germany ..	56½	50½
Remainder of Europe	185	198½
Others	265	211
	867½	785

From the above table, the considerable upturn which has taken place in recent months in United States' industrial activity, as reflected in increased natural rubber consumption, is clearly demonstrated.

Synthetic Rubber

Synthetic rubber consumption is illustrated in the following table:

SYNTHETIC CONSUMPTION

	Jan.-May 1959	Jan.-May 1958
UK	30½	27
US	426	338½
France	25	25½
Western Germany ..	25	21
Remainder of Europe	25	25½
Others	68½	52½
	600	490

As in the case of natural rubber, the United States registered an increase in synthetic rubber consumption of the order of some 20-25%.

US General Position

The United States Department of Commerce has issued the following preliminary statistics for the month of May:

NATURAL RUBBER

Consumption: 38,777 tons, of which latex 5,429 tons.

Stocks: 82,983 tons, of which latex 9,718 tons.

SYNTHETIC RUBBER

	Production	Consumption	Stocks
S-Type ..	89,625	60,870	156,209
Butyl ..	6,467	3,978	12,719
Neoprene	10,249	6,914	15,024
N-Type ..	3,610	2,853	7,820
	109,951	74,615	191,772

Total new rubber consumption during May amounted to 113,392 tons, compared with the April figure of 121,222 tons, and the proportion represented by natural rubber remained at 34.2% in both months. New rubber consumption to the end of May totalled 655,981 tons, compared with a figure of 528,635 tons for the first five months of 1958, representing an increase of around 25%.

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Curable Polymers

No. 811,725. E. I. du Pont de Nemours and Co. Application and Filed, August 26 1955. Application in USA, October 11, 1954. Published, April 8 1959.

The invention is for a new class of elastomers made by reacting organic diisocyanates with diols of high molecular weight. Examples of the reactants are given together with details of the preparation of the elastomers and their chemical structure. The elastomers can be cured either by further reaction with isocyanate groups or by means of sulphur when unsaturated carbon chains are present in the polymer. The elastomers may be used for the manufacture of tyres and other products normally made from rubber. They have excellent resistance to heat and cold, direct sunlight, oxygen, ozone and oil, and possess outstanding resistance to abrasion and deterioration by flexing or stretching. They have a low brittle point, some of the products being flexible as low as –70°C. Compounding ingredients normally used for rubber are suitable for the new elastomers.

Melt-Spinning of Nylon

No. 811,808. British Nylon Spinners Ltd. Inventors: G. T. Davies, D. M. Jones, G. K. Lewis, T. R. Griffin, E. Wilson, E. J. R. Hewitt and J. O'Neill Fisher. Application, February 8, March 28 and 29, July 13 1957. Filed, January 14 1958. Published, April 15 1959.

In a process for melt-spinning filaments and films from synthetic linear polymers such as nylon, the polymer in solid particulate form is forced under pressure to a heated melting means and the molten polymer is caused to flow in one or more continuous streams downwardly into a pool of the molten polymer above the surface of which is maintained an atmosphere free of oxygen at a constant pressure at or about atmospheric pressure, the level of the surface of the pool being maintained constant automatically by controlling the rate of feed of the solid polymer. The molten polymer is withdrawn from the pool and extruded into filaments or films. Apparatus for carrying out the process is also claimed.

Nylon tyre cord is usually composed of yarns having a denier of 840 while a tenacity of at least 9gm. per denier is desirable. By means of the process and apparatus of the invention, it is possible to melt-spin nylon yarns of this denier and tenacity at a rate of 19lb. per hour, whereas previously it was impracticable to spin nylon yarns of this tenacity on a production basis at all. Furthermore, the apparatus of the invention is able to remain in operation, before having to be withdrawn for cleaning, some ten times longer than any known gravity melting apparatus.

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

THERE has been a 'boomlet' in the shares of the plastics and rubber manufacturing groups since we last went to press. The gains extend all through our comprehensive list of share prices and vary from a few pence up to several shillings.

In a number of instances the upward adjustment has been the direct result of good company news or of promising developments (not, of course, forgetting our old friend the take-over rumour) but for the most part the lift has been brought about by nothing more than strong investment demand on a market which is not too well supplied with stock.

This buoyancy is by no means peculiar to the plastics and rubber manufacturing groups but embraces nearly all the industrial 'blue chips' and many of the leaders in other sections of the market.

The recent rise, one might also term it a recovery, has confounded the experts who had looked for some tapering off in values during the high summer months.

The decrease in tyre prices and the accompanying reports of a price-cutting war has tended to unsettle the relevant shares. AVON INDIA RUBBER are now slightly below their best price whilst DUNLOP have not encountered as much support as one might have expected in this 'bull' market. Whether the fears are well founded is, of course, entirely another matter. Prices may well be lower and profit margins may fall, but it is well to remember that these firms are supplying a booming industry—an industry more buoyant now than ever before in its short and staggering history.

The Americans and Continentals have been active buyers of several of the equity counters in our list. The dollars have been backing the DE LA RUE enterprise. One can only assume that this is the direct result of the company's close alignment with the FORMICA group of America.

From our last published price De La Rue ordinary are up to 49s., a gain of 11s. The yield on them may appear low to UK investors but it is still higher than that shown on many comparable American stocks.

There has been some Continental support for IMPERIAL CHEMICAL ordinary. This is partly responsible for the price of 44s. compared with only 37s. a few weeks back. There is little danger of I.C.I. trimming its ordinary dividend this year—but there also seems little hope of an increase. The current buying must therefore be based, so far as the British investor is concerned, on the long term outlook and must completely disregard the political risks.

The improvement in the general industrial outlook was responsible for the lift in the shares of the TURNER AND NEWALL giant while UNIVERSAL ASBESTOS, a very energetic enterprise indeed, came into the news with another product.

Fears of continued competition and trading difficulties clipped the price of RUBBER IMPROVEMENTS shares further and for just the opposite reasons COURTAULDS ordinary were prominent among the plus signs. The chairman

Continued on page 74

Share Price Movements

Par Value	Company	1958-59 High	Low	June 13	Latest
5/-	Albright & W. Ord. ..	27/9	13/4½	27/6	25/4½
£1	„ „ „ 5% Pref...	16/7½	15/4½	16/3	16/3
5/-	Anchor Chemical Ord...	14/4½	10/3	14/-	14/3*
5/-	Andersons Rub. Ord. ..	4/3½	3/-	3/2½	3/2½
2/-	Anglo-Amer. Vulc. Fibre Ord.	4/3	2/-	4/-	3/6
£1	Angus Geo. Ord. ..	29/10½	21/-	27/9	27/10½
5/-	Armitage (Sir Elk.) Ord.	4/10½	2/3	4/6	4/6½
5/-	Ault & Wiborg Ord. ..	23/-	11/9	17/6	21/9
£1	Avon India Rubber Ord.	42/6	27/-	42/6	40/6
£1	„ „ „ 6% Pref.	18/6	17/3	17/6	17/9
10/-	Bakelite Ord.	30/6	17/-	30/3	30/6
£1	„ 6% Pref. ..	19/6	18/3	18/3	18/3
£1	Baker Perkins Ord. ..	47/9	30/7½	47/6	43/9
4/-	Bank Bdg. Rubber Ord.	2/7½	1/6	2/-	2/6
5/-	Boake (A.) Roberts Ord.	18/6	9/-	13/6	14/9
£1	„ „ „ 5% Pref.	15/1½	13/9	13/9	13/9
4/-	Brammer H. Ord. ..	14/6	9/6	12/-†	14/3†
5/-	Bridge, David Ord. ..	32/-	16/3	28/3	32/-
5/-	Bright, John Ord. ..	13/10½	8/9	11/6	13/-
2/-	Brit. Ind. Plas. Ord. ..	8/1½	4/9	7/9	7/4½
2/-	„ 10% (tax free) Pref.	5/9	4/8½	4/6	4/7½
£1	British Xylonite Ord. ..	59/9	28/6	56/-	58/-
£1	„ „ 5% Pref.	15/9	14/-	15/7½	15/9
5/-	BTR Ind. Ord.	13/3	9/4½	10/9	9/-
£1	„ „ 7½% Pref. ..	22/9	20/9	22/6	22/9
£1	Courtaulds Ord... ..	40/6	20/-	38/9	40/4½
£1	„ 5% 1st Pref.	18/6¾	15/7½	16/3	17/6
£1	„ 6% 2nd Pref.	20/3	17/1½	19/6	20/3
4/-	Cow, P. B. Ord. ..	6/9	3/6	6/-	6/8½
£1	„ 5% Pref. ..	14/-	10/9	14/-	14/1½
5/-	Dale, John Ord... ..	16/6	10/-	12/9	14/-
£1	„ „ 6% Pref. ..	16/-	13/-	15/10½	15/11½
1/-	Dannimac Mfg. Ord. ..	8/9	2/6	8/1½	8/6
10/-	De La Rue Ord. ..	54/-	42/9	38/-	49/-§
£1	„ „ „ 3½% Pref. ..	11/9	10/-	10/9	10/9
6/8	Distillers Co. Ord. ..	27/8½	15/9	26/10½	27/6
£1	„ „ 6% Pref...	21/7½	19/10½	21/6	21/4½
£100	„ 5% Conv. Loan	£96½	£91	£93	£94½
£100	„ 5½% Unsec. Loan	£95	£87 7/16	£93	£94½
10/-	Dunlop Rubber Ord. ..	25/1½	14/9	29/9	‡24/10½
£1	„ 5½% Pref.	19/-	15/10	17/6	18/10½
£100	„ 3½% 1st Debs.	£75½	£67¾	£75½	£75
£100	„ 4½% 2nd Debs.	£84	£78	£82½	£84
4/-	Ebonite Cont. Ord. ..	15/3	7/6	14/3	11/3
£1	English China Clays Ord.	64/-	29/9	63/9	63/9

Par Value	Company	1958-59 High	Low	June 13	Latest
£1	Goodyear Tyre 4% Pref.	12/9	12/-	12/6	12/3
5/-	Greeff Chem. Ord. ..	22/6	14/-	20/-	22/3
10/-	„ „ 5½% Pref. ..	8/-	7/9	8/-	8/-
4/-	Greengate & Irwell Ord.	7/0¾	4/4½	5/-	4/6
£1	Harrisons & Crosfield Dd.	61/3	43/9	56/3	60/-
1/-	Hunt & Moscrop Ord. ..	1/7½	1/1½	1/4½	1/7½
£1	Imp. Chem. Ord. ..	40/1½	28/3	37/1½	40/-
£1	„ „ 5% Pref. ..	17/9	16/-	17/-*	17/9
£100	„ 4½% Unsec. Loan	£88½	£80	£87	£84¾*
£100	„ 5½% Conv. Loan	£129	£99	£127½*	£124½
1/-	Kleemann (O. & M.) Ord.	5/9	2/6	5/4½	5/9
£1	„ „ 6½% Pref.	16/9	15/-	16/6*	16/6
2/-	Lacrinoid Prod. Ord. ..	2/5½	1/5¾	2/4½*	2/5½
5/-	Laporte Ind. Ord. ..	27/6	13/7½	23/6	22/6
£1	„ „ 7½% Pref.	22/10½	21/10½	22/3	22/6
£1	Leyland & Birm. Rubber Ord.	55/9	39/9	51/3	55/-
£1	„ „ 6% Pref.	21/3	16/1½	16/9*	17/-
2/-	London Rubber ..	10/-	6/3	18/7½	10/-‡
£1	„ 6% Red. Cum. Pref.	19/9	16/3	18/9	18/9
£1	McKechnie Bros. Ord.	45/-	32/6	41/3	41/3
£1	„ „ 'A' Ord.	44/6	30/-	38/9	38/9
£1	„ „ 6% Cum. Pref.	17/-	16/-	16/6	16/9
5/-	Monsanto Chem. Ord. ..	18/1½	13/-	16/6	17/9
£1	„ „ 3½% Pref.	13/-	11/-	13/-	13/-
£100	„ 6% Debs.	£104	£101½	£103*	£103½
£1	North British Rubber ..	—	—	16/-	16/-
5/-	Redfern Holdings Ord...	5/2½	2/10½	3/6	4/10½
2/-	RFD Ltd. Ord.	6/6	3/5½	5/6	5/3½
£1	„ „ 5½% Pref. ..	14/9	11/6	14/9*	14/6
2/-	Rubber Imp. Ord. ..	15/6	4/9	5/6	5/1½
2/-	„ „ 'A' Ord.	14/3	4/6	5/-	4/3
£1	„ 5% 1st Pref.	12/3	10/-	10/-	10/-
5/-	Rubber Reg. Ord. ..	13/-	10/6	12/9	12/3
4/-	Shaw Francis Ord. ..	16/3	9/9	20/-*	15/7½†
2/-	Silentbloc Ord. ..	10/2½	7/6	9/-	10/2½
2/-	Sussex Rubber Ord. ..	1/11½	7½	1/10½	1/11½
5/-	Sutcliffe Speak Ord. ..	8/10½	5/-	7/-	8/9½
£1	Turner & Newall Ord. ..	76/4½	52/-	71/9*	75/4½
£1	„ „ 7% Pref.	25/-	22/1½	23/3	24/10½
5/-	Universal Asbestos Ord.	23/10½	8/0¾	21/9	23/9½
5/-	Viscose Dev. Ord. ..	13/9	6/3	10/3	11/9
5/-	Warne William (Holdgs.) (Ord.	12/9¾	8/-	12/9	13/6

*Ex-dividend †Ex-all ‡Ex-bonus §Ex-rights

Rubber Markets

LONDON

Sharp gains have been recorded in the London rubber market during the past week following an advance in the East. The rise reflected the shortage of nearby supplies following recent American and Russian buying. Spot is three farthings higher at 31¾d. per lb. and comparable gains are recorded in nearby positions, while the more distant positions record rises of around a half-penny.

Latest prices are as follows:

No. 1 RSS Spot: 31⅝d.-31⅞d.

Settlement House:

September 31⅛d.-31⅜d.

October/December 31⅛d.-31⅜d.

January/March 30⅝d.-30⅞d.

April/June 29⅛d.-29⅜d.

July/September 28⅝d.-29⅛d.

October/December 28⅛d.-28⅜d.

No. 1 RSS cif basis ports:

September 31⅛d.-31⅜d.

October 30⅞d.-31d.

Godown:

Sept. 107⅜ Straits cents nominal.

LATEX

Centrifuged latex per gallon in drums, September shipment, 18s. 9d. seller, cif European ports. Spot, seller, 19s. Bulk, seller, 18s. 8d. nominal price. Creamed, seller, 18s. 3d. Normal, seller, 14s. 3d.

AMSTERDAM

The Amsterdam rubber market ruled as follows on August 17:

	Guilders per kilo	
No. 1 RMA	Aug. 17	Previous
August	3.02	3.03
September ..	3.02	3.03
October	3.01	3.02
November ..	3.01	3.02
December ..	3.01	3.02
Oct./Dec. ..	3.00½	3.01

Sales: 45 Tendency: quiet

DJAKARTA

Market closed for public holiday.

SINGAPORE

Overseas advices were about as expected on August 17 and there was little change in opening levels. Thereafter, the market sagged, the majority of dealers being disinclined to trade. The October position was particularly depressed as buyers were holding off. Lower sheets were neglected and factories were quiet. In a very quiet afternoon session, only small demand was noted for September No. 2 RSS, and some factory enquiry which was filled at current differentials. Afterhours, more sellers appeared and the buying became less enthusiastic. The market finished on a quiet note.

	Straits cents per lb., fob Malayan ports to open ports	
	Close	Previous Close
No. 1 RSS, Sept.	106⅛–106¼	107⅛–107¼
Oct.	104½–105	105⅛–106⅛
No. 2 RSS, Sept.	105⅛–106	106⅛–106¼
No. 3 RSS, Sept.	104⅛–105¼	105⅛–106¼
No. 4 RSS, Sept.	102½–103½	103½–104½
No. 5 RSS, Sept.	99½–100½	100½–102¼
No. 1 RSS, Spot	109½–110	110¼–111¼
No. 3 blanket, thick remilled, Sept. ..	101 –103	102½–104½
No. 1 fine pale crepe, Sept. ..	114 –116	114 –116
2x thin brown crepe, Sept. ..	101 –102	101½–102½

Tendency: quiet

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rec. drums fob at 210.00d. per gallon.

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on August 17 was 34.75 (same) US cents per lb.

NEW YORK

The following prices ruled in New York on August 17:

DEALERS' PRICES

	Ex dock, US cents per lb.		
	Aug. 17	Previous	
No. 1 RSS, Sept.	37¼t	38½b–39a	
Oct.	36⅜b–36⅝a	38½b–39a	
No. 2 RSS, Sept.	37⅛n	38⅜b–38⅞a	
Oct.	36½b–36⅝a	38⅜b–38⅞a	
No. 3 RSS, Sept.	37⅛n	38b –38½a	
Oct.	36½b–36⅜a	38b –38½a	
No. 1 RSS, Spot	38n	38½b–39a	
No. 3 amber blanket crepe, Nov.	36⅛n	Oct.	37n
No. 1 latex, thin crepe, Sept. ..	37⅜n	Aug.	37⅞n
No. 1 latex, thick crepe, Sept. ..	38n	Aug.	38⅛n

FUTURES—REX CONTRACT

	US cents per lb.	
	Close	Previous Close
Sept. ..	39.10b–39.40a	39.40b–39.50a
Nov. ..	36.60b–36.70a	37.10t
Jan. ..	35.50b–35.65a	35.95t
March ..	35.00b–35.15a	35.45b–35.55a
May ..	34.50t	35.00b–35.15a
July ..	34.10n	34.60b–34.85a
Sept. ..	33.90n	34.50n

Sales: 103 Tendency: B' steady

Rubber futures were softer on scattered selling in a moderate to fair volume of dealings on August 17. Traders said that lack of offtake in the physical market induced the selling. Shipment offerings were also softer but not particularly pressing on the market.

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on August 17 was 136¾ (138¼) Ceylon cents per lb.

STOCK MARKET

Continued from page 73

of this vast group has revealed that trading conditions have improved. The development of the packaging and plastics interests is being speeded up and there seems every reason to hope that the current market price of the shares will be more than justified.

DISTILLERS ordinary shares have rather disappointed of late. The full results were well up to expectations with the group profit £2,300,000 higher at £27,100,000, the dividend was well in line with market hopes at 12¼% compared with 10¾% last time. The capital requirements of the group have been readjusted and it now seems unlikely that the issue envisaged last year will mature.

Despite a rather optimistic statement by the chairman, LAPORTE INDUSTRIES ordinary shares have slipped back recently. This tendency will no doubt be arrested if the current market tone continues.

The COMMERCIAL PLASTICS group which is owned by a 'consortium' of industrial firms whose interests range from textiles to stores, reports an increase of nearly £200,000 to £902,000 in the group trading profit. The dividend is higher by 1 5/6ths% at 16%. Sales during the current year to date have been well maintained despite increased competition and the directors anticipate that, subject to unforseen circumstances, the year's results should again be satisfactory. It has long been the desire of the board to bring this company within the scope of the ordinary investor. It may well be a public offering of its shares may not now be long delayed.

ANCHOR CHEMICAL CO. has declared an interim dividend of 5% and WILLIAM WARNE has repeated its interim of 7½% from profits of around £160,000 for the half year to June last compared with £376,000 for the whole of 1958.

Canadian Rubber

Rubber consumption in Canada in April climbed 35% to 23,282,000lb. from last year's corresponding total of 17,222,000lb. Consumption of natural rubber increased to 8,364,000lb. from 5,964,000, synthetic to 11,391,000lb. from 8,460,000, and reclaim to 3,527,000lb. from 2,798,000. Natural rubber consumed in April amounted to 35.9% of the total (34.6) synthetic to 48.9% (49.1%) and reclaim to 15.2% (16.3%).

Industry INTELLIGENCE

Technical Data

Ty-Ply Rubber-to-Metal Bonding Agents

Ty-Ply bonding agents are well-established materials for bonding natural and synthetic rubber compounds to most metal surfaces during vulcanization. These bonding agents are free-flowing liquids consisting essentially of specially developed resins in solution, together with some dispersed solids. Detailed information on the use of the various grades of Ty-Ply is given in Report No. 143/R/59, issued by the Anchor Chemical Co. Ltd., Manchester 11.

The six grades and the types of rubber with which they are used are as follows: Ty-Ply Q and 3640—natural rubber and SBR compounds; Ty-Ply S—neoprene and hard nitrile compounds; Ty-Ply BN—nitrile rubber compounds; Ty-Ply UP and BC—butyl rubber compounds. Instructions for the use of Ty-Ply bonding agents may be summarized as follows: clean the metal, stir the Ty-Ply, apply a uniform coat of Ty-Ply to the metal, allow to dry, prepare the unvulcanized rubber surface, assemble and cure. These several steps are fully described. It is possible to compound the rubber for almost any combination of physical characteristics and still obtain excellent adhesion with a vulcanized Ty-Ply bond, but the highest bond strengths are achieved when the compound has a Shore hardness of approximately 65. Recipes are given for compounds 60-65 Shore hardness based on natural rubber, SBR, butyl rubber, nitrile rubber and neoprene, respectively, which have proved satisfactory in bonding tests with Ty-Ply. A table shows the degree of adhesion obtained between these rubbers and 18 different metals and alloys by using the appropriate grade of Ty-Ply. Examples of commercial applications of Ty-Ply include oil seals, solid tyres, bogey wheels, shock absorbers, rubber-covered rolls, rubber-lined tanks and vessels, industrial wheels and casters, engine mountings and tank blocks.

Califlux GP

Califlux GP is a petroleum product compatible with natural rubber, SBR, neoprene and butyl rubber in all proportions and with nitrile rubber up to 30 phr. It functions as a plasticizer, extender and vulcanization activator for safe, level cure, and gives excellent physical properties in both soft and hard rubber goods. Data for the physical properties and chemical composition of Califlux GP are given in a data sheet issued by the Golden Bear Oil Co., 325 West 8th Street, Los Angeles 14, Calif., USA. The material is reddish brown in colour and transparent, the sp. gr. is 1.0–1.02, the viscosity is 5,000–20,000 cps at 25°C. and 20–40 cps at 90°C. while the mixed aniline point is 40°C. Determination of the above physical properties will serve as a quick control test for products derived from the same crude source and the same manufacturer. For example, it will distinguish between Califlux GP, Califlux 550, Bearflex LPO or any of the other Golden Bear products.

Machines, Materials and Equipment

Synthetic Rubber Tape

A synthetic rubber sealing tape, U-100, reinforced with nylon fibres, that is now being introduced to curtain wall fabricators in the US, has been developed by the United States Rubber Co. In a typical curtain wall installation the use of the tape allows workers to install porcelain exterior panels in structures in about a quarter of the time normally used for such a job. Formerly they had to undo a dozen screws, place the panels in place with four aluminium snap beads, then

refasten all 12 screws. Using tape, they are now able to eliminate all use of screws and merely put lengths of the rubber tape on the aluminium beads which snap into place on each side of the pea-soup-green porcelain panels for permanent installation. The tape's trial testing programme has uncovered many useful characteristics, such as resistance to oxidizing and hardening, virtually permanent flexibility, and excellent adhesion to a variety of surfaces, including glass, aluminium and brass.

Vinyl Plastic Material

A new vinyl plastic material that can be easily moulded into gramophone records has been developed by the Naugatuck Chemical Division, United States Rubber Co. Records made from this resin will give high fidelity reproduction with unusually low background noise level. The new material, called 'Marvinal VR 60,' is described by researchers as 'soft.' This softness permits record makers to produce exacting reproductions of the metal master record. It also ensures a minimum of rejects due to moulding flaws. A combination of polyvinyl chloride and vinyl acetate, the new material has low molecular weight and high density. It can be heated quickly to the viscosity needed for moulding recordings. It is now being tested by several record companies.

ASE Automatic Scales

The range of ASE fully-automatic scales marketed by the Shandon Scientific Co. Ltd. has now been widened to include larger capacity models for industrial purposes. These scales, which have built up a considerable reputation in the laboratory field, combine high-speed operation and readability with close accuracy. They are, the makers claim, ideal for weighing valuable raw materials for processing or finished products for packaging. The readability of the ASE scales is achieved by a system of shuttered indicators. These enable the pointer to make five revolutions of the dial to cover the instrument's full range, equivalent to a reading line of some 13ft. The graduation divisions are about ⅛in. apart, and the scale can be read to half a division. Five basic models are available.

Publications Received

Rispa Bulletin

The Bulletin of the Research Institute of the Sumatra Planters' Association, No. 24, February, is devoted to the reprinting of a paper by Norbert Faderl, Ph.D., entitled 'Colorimetric Determination of Copper in Rubber and Latex.' A colorimetric method for the determination of copper in rubber and latex has been worked out, using Fast Grey RA as reagent, and the influence of different substances on this determination has also been investigated. After destruction of organic matter, the analysis can be carried out using a wavelength of 547 mμ without previous separation of other ions present in the sample. The method described is rapid and simple and permits copper in concentrations as low as 0.02 ppm to be determined.

Tesamoll Polyurethane Foam

Sealdraught Ltd., Chandos House, Buckingham Gate, London, S.W.1, sole distributors in the UK of 'Tesamoll,' expanded polyurethane, a product of US origination, have issued a booklet describing the foam and outlining its properties and applications.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

ASTRALINE (781,313) For crimped continuous-filament textile yarns made of thermoplastic materials. By Ernest Scragg and Sons Ltd., Sunderland Street Works, Macclesfield, Cheshire. To be associated with No. 781,314 (4217, 480). (By consent.) (Class 23; May 6 1959).

VALTEX (774,100) For compositions of synthetic resins containing pigments, being colouring matters for use in the manufacture of articles of textile materials or of films of plastics. By Interchemical Corporation, 67 West 44th Street, New York. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. (Class 2; May 13 1959.)

CELLOTHENE (772,284). For wrapping and packaging materials included in Class 16. By British Cellophane Ltd., Bath Road, Bridgwater, Somerset. To be associated with No. 538,751 (2867, 288). (Class 16; May 13 1959.)

VENSEAL (770,468). For paper and films of plastics or of cellulose and included in Class 16 and laminations of two or more of these materials; and laminations of one or more of these materials with metal foil; all being goods externally surfaced wholly or partly with coatings of thermoplastic adhesives, all sold uncovered or covered on one or both sides with porous material and all being goods for wrapping (packaging) purposes in which the paper, the plastics or the cellulose or the paper, plastics and cellulose predominate. By Venesta Ltd., Vintry House, Queen Street Place, London, E.C.4. Class 16; May 18 1959.)

(782,460). For insulation materials made of expanded polystyrene plastics. By Commerce Factors (GB) Ltd., Gallows Park, Torpoint, Cornwall. To be associated with No. 738,675 (4027, 767). (Class 17; May 13 1959.)

PLASTRAP (783,694). For drain traps made of plastics. By Clarence Ernest Masefield, Unity Works, Victoria Street, Birmingham, 1 (Class 19; May 13 1959.)

MANNIDE (779,596). For soles and heels, all for footwear. By the Avon India Rubber Co., Ltd., Avon Rubber Works, Melksham, Wiltshire. (Class 25; May 13 1959.)

SPUNGDIS (782,500). For games (other than ordinary playing cards) and playthings; and gymnastic and sporting articles (except clothing). Fussell's Rubber Co. Ltd., Knightstone Mills, Station Road, Worle, Weston-super-Mare, Somersetshire. (Class 28; May 13 1959.)

NEW COMPANIES

J. Bird Moyer Co. of Ireland Ltd. (17,364).—Regd. Dublin, February 10 1959. Capital: £25,000 in £1 shares. To carry on the business of developing and manufacturing artificial teeth, dental supplies, dental materials and dental commodities of all kinds, etc. The directors are: Joseph Alfonso Garay, 9 Elmwood Avenue, Narveth, Pennsylvania, USA; Vincent McCormack, 4 Lincoln Place, Dublin; Dermot Meehan, Mullary House, Dunleer, Co. Louth.

Polhill and Green Ltd. (625,473).—April 9. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastic, modelling and materials, substances, compositions and fabrics, etc. The directors are: Edward T. R. Polhill, 4 Southgate Road, Crawley; Leonard T. Green, 23 The Birches, Three Bridges; David R. Polhill and Elizabeth M. Polhill. Regd. office: 58 Brighton Road, Crawley, Sussex.

Bibby, Manchester and Co. Ltd. (625,874).—April 15. Capital: £4,000 in £1 shares. To carry on the business of manufacturers of and dealers in water and rainproof coats, aprons, etc. The directors are: Barry A. Manchester, 'Durham House,' 9 Walnut Grove, Radcliffe-on-Trent, Notts.; Noel Bibby, 5 Ridge Lane, Valley Road, Radcliffe-on-Trent. Regd. office: 24 Warser Gate, Nottingham.

W. A. Goold Ltd. (625,954).—April 15. Capital: £10,000 in £1 shares. To acquire the business of 'W. A. Goold,' carried on by Mary P. and M. W. Goold at Bath Street, Walsall; to carry on the business of leather and plastic manufacturers and merchants, etc. The directors are: Michael W. Goold and Mary P. Goold, both of 31 Princes Avenue, Walsall.

Plastics and Packaging Developments (New Cross) Ltd. (625,945).—April 15. Capital: £20,000 in 1,000 'A' and 19,000 'B' shares of £1 each. To carry on the business of manufacturers of and dealers in plastics, paper, board and rubber goods, etc. The directors are: Selwyn Brown (permanent), 33 Wentworth Gardens, London, N.13; Edgar C. Smith (permanent director and chairman), 12 Conduit House, Hyde Vale, London, S.E.10; Patrick J. Canty, 458 Green Lane, London, S.E.9. Regd. office: Erlam Works, Erlam Road, London, S.E.16.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on June 17 1959

Dunlop Rubber Co. Ltd. Moulded mats. 815,083.

British Industrial Plastics Ltd. Polyester resin compositions. 815,084.

Petrochemicals Ltd. Chlorinated polythene. 815,086.

General Tire and Rubber Co. Method and apparatus for treating nylon and polyester fibre cords. 815,065.

Svit, Norodni Podnik. Machine for fastening a shoe-bottom of thermoplastic material to a shoe-upper. 814,875.

Pirelli S.p.a. Pneumatic vehicle wheel tyres. 815,053.

Rohm and Haas Co. Aromatic acid amides of aminoalkyl vinyl ethers and their polymers. 815,103.

Midland Silicones Ltd. Resinous compositions. 815,107.

Pirelli S.p.a. Pneumatic vehicle wheel tyres. 815,055.

Koppers Co. Inc. Polymerization process. 815,161.

General Electric Co. Ltd. Processes for the production of cast resin tubes. 815,164.

E. I. du Pont de Nemours and Co. Curable polyurethane and polyurethane-polyurea polymers. 815,122.

American Biltrite Rubber Co. Inc. Process and apparatus for moulding mats. 815,123.

E. I. du Pont de Nemours and Co. Polymeric products. 815,168.

Bosch G.m.b.H. Commutator type dynamo-electric machines. 814,911.

Dow Chemical Co. Method for moulding expandable thermoplastic resinous materials and moulded articles thereby obtained. 815,173.

Rohm and Haas Co. Polyesters and condensation products thereof with aminoplasts. 815,179.

General Tire and Rubber Co. Aircraft tyre. 815,139.

Dow Chemical Co. Compositions of vinyl aromatic polymers and synthetic rubber stabilized with tetra-(2-hydroxyalkyl) alkylene diamines. 815,201.

Montecatini Soc. Generale L'Industria Mineraria e Chimica. Device for cutting thermoplastic materials. 815,146.

W. J. Stokvis Koninklijke Fabriek van Metaalwerken NV. Tools for inserting rings in rubber and like tubes. 814,951.